JOURNAL

OF

THE FRANKLIN INSTITUTE

OF THE STATE OF PENNSYLVANIA

FOR THE

PROMOTION OF THE MECHANIC ARTS.

OCTOBER, 1849.

## CIVIL ENGINEERING.

*Contributions to Railway Statistics, in* 1846, 1847, *and* 1848. *By* HYDE CLARKE, ESQ.

(Continued from page 175.)

*No.* 21.—*Agricultural Traffic.* The preceding sections show the services rendered to agriculture by railways. The accommodation may be classed under the following heads:—

*Brought to the Farm.*

| | Tons. |
|---|---|
| Building materials, draining tiles, hop-poles, &c., | 350,000 |
| Manures, lime, bones, sand, &c., | 300,000 |
| Hay, turnips, oil-cake, &c., for feeding stock, | —— |
| Clover and other seeds, | 15,000 |
| Salt, | —— |
| Coals, | 4,500,000 |
| Lean stock, 100,000 cattle; 250,000 sheep. | |
| Implements and iron, | —— |
| Fish, | 10,000 |
| Foreign provisions and groceries, | —— |

The whole weight carried by railway to the farms cannot be less than 6,000,000 tons, on which a very great saving has been effected.

*Produce carried to Market.*

| | | | |
|---|---|---|---|
| Cattle, | 400,000 head. | Horses, | —— |
| Calves, | —— | Provisions, | 700,000 tons. |
| Sheep, | 1,750,000 " | Grain, | —— |
| Swine, | 100,000 " | | |

Other produce, hides, hams, wool, hops, malt, ale, beer, cider, perry, hay and animal food, timber, bark.

*No.* 22.—*Parcels Traffic.* This is a well-paying branch of revenue, connected with the passenger traffic, and has been latterly much improved. The accounts do not, however, show the full extent of the parcel traffic, as a great portion of it is still included in the general account for goods, the carriers making up parcels as goods. The results are therefore minimum results.

The total receipts in each year are as follows:—

| | 1845. | 1846. | 1847. |
|---|---|---|---|
| Detailed returns, | £156,910 | £208,952 | £266,043 |
| Add for half-years omitted, | —— | 16,500 | 1,100 |
| Add for companies omitted, | 40,000 | 8,000 | 2,400 |
| Total, | £198,910 | £233,452 | £269,543 |

The returns of parcel traffic are the only returns which show any improvement; the others afford less information in each year.

From the above amounts a correction has to be made for passengers' luggage charged in excess, included in the parcels returns. This is usually about 6 per cent of the gross returns; but as it is deducted in some cases, 5 per cent. is a sufficient compensation. It must be observed that in some cases parcels are included in the goods return.

The South Devon return includes receipts for telegraphic messages.

Making the above correction, the net receipts for parcels will be—

| 1845. | 1846. | 1847. |
|---|---|---|
| £186,000 | £222,000 | £255,000 |

It is not necessary to give the detailed charges for parcels, as they include sometimes charges of booking and delivery.

In 1844–5, the number of parcels enumerated was 362,202, and the receipts £14,034, which gives an average rate of 9·29*d.*, or a little more than 9¼*d.* per parcel, or rather more than 28 parcels per pound. Taking this as the average, the total number of parcels carried in 1844–5 would be about 4,500,000.

In 1845–6, the number of parcels enumerated was 384,353, and the receipts £11,559, which gives an average rate of 7·2*d.*, or nearly 7¼*d.* per parcel, or more than 33 per pound. Taking this as the average, the total number of parcels carried in 1845–6 would be about 7,400,000.

In 1846–7, the number of parcels enumerated was 530,641, and the receipts £8685, which gives an average of 3·9*d.*, or nearly 4*d.* per parcel.

It is questionable, however, whether the average is so low in any of the years, as the London and North Western, which has so large an amount of the parcels traffic, is not taken to form part of the average. It is, however, certain that the average rates for the conveyance of parcels have been much reduced. A fair average will be 18 parcels per pound for 1844–5, 19 for 1845–6, and 20 for 1846–7. This will give the whole number of parcels carried by railway in each year as under—

| | |
|---|---|
| 1845, - - - - - | 3,350,000 |
| 1846, - - - - - | 4,200,000 |
| 1847, - - - - - | 5,000,000 |

The number of parcels carried both ways to each town may be reckoned thus:—

| | | | |
|---|---|---|---|
| London, | 1,500,000 | Brighton, | 60,000 |
| Manchester, | 300,000 | Sheffield, | 60,000 |
| Liverpool, | 200,000 | Preston, | 50,000 |
| Leeds, | 200,000 | Edinburg, | 40,000 |
| Birmingham, | 200.000 | Hull, | 30,000 |
| Glasgow, | 100,000 | Exeter, | 20,000 |
| Bristol, | 100,000 | Newcastle, | 20,000 |
| York, | 100,000 | Carlisle, | 20,000 |
| Bath, | 100,000 | Chester, | 10,000 |
| Cambridge, | 100,000 | Dundee, | 10,000 |
| Southampton, | 100,000 | Ipswich, | 10,000 |
| Dover, | 80,000 | | |

In consequence of new arrangements made by the companies, a great increase of business has taken place in the carriage of booksellers' parcels. There is a great tendency in the parcels traffic to increase, in consequence of the extension of the supply of the local grocers, linen drapers, &c., from London and the great towns, for it is well known that, instead of taking stock a few times yearly, they now receive frequent supplies.

The chief parcels traffic is on the following lines:—

| | No. of parcels. | Receipts. |
|---|---|---|
| London and North Western, | 2,000,000 | £104,738 |
| Great Western, | 700,000 | 34,155 |
| Midland, | 600,000 | 28,986 |
| Eastern Counties, | 480,000 | 16,669 |
| Lancashire and Yorkshire, | 400,000 | 5,225 |
| York and North Midland, | 300,000 | 13,476 |
| York and Newcastle, | 300,000 | 8,724 |
| London and South Western, | 200,000 | 10,629 |
| London and Brighton, | 200,000 | 9,596 |
| South Eastern, | 200,000 | 8,793 |

*No.* 23.—*Mails.* The total receipt detailed in 1845 was £77,000, to which has to be added for omissions £23,000, making a gross total of £100,000.

The total receipt detailed in 1847 was £105,872, to which has to be added for omissions £25,000, making a gross total of £130,000.

*No.* 24.—*Miscellaneous Goods.* Among other articles enumerated in the returns, are furniture and vitriol.

In the year ending 30th June, 1846, there was carried on the Manchester and Bolton, 256 tons of furniture; on the South Western, 325 tons (half-year); and on the Brighton, 2923 tons. The receipts were, Manchester and Bolton, £128, and Brighton, £4687.

In the year ending 30th June, 1847, there was carried on the Brighton Railway 4669 tons, the receipts for which were £6660.

The carriage of furniture is now considerable, the railway being preferred to the canal for long distances. The rates per ton per mile are high. On the Manchester and Bolton the rate is 12*d.*, on the London and South Western 7·26*d.*, and on the London and Brighton 7·49*d.*

Vitriol is carried on the Newcastle and Carlisle Railway. In the year ending 30th June, 1846, 17 tons, bringing £11, and in 1847, 62 tons, bringing £39. Vitriol is classed as dangerous, and the rate for carrying it is 6¾*d.* per ton per mile.

The total tonnage in each year was as follows:—

| 1844. | 1845. | 1846. | 1847. |
|---|---|---|---|
| 9,823,533 | 12,522,976 | 15,871,179 | 16,699,382 |

The following shows the distribution of the traffic in 1847, in tons:—

| | |
|---|---|
| Coals and Coke, | 8,900,000 |
| Ironstone, | 600,000 |
| Iron, | 300,000 |
| Iron Dross, | 110,000 |
| Copper and Tin, | 23,000 |
| Limestone and Lime, | 300,000 |
| Building Stones, | 600,000 |
| Sand, | 37,000 |
| Ballast, | 36,000 |
| Bricks and Tiles, | 5,000 |
| Miscellaneous Minerals, | 300,000 |
| Fish, | 43,000 |
| Grain, | 300,000 |
| Provisions, | 400,000 |
| Manure, | 40,000 |
| Goods, Timber, and Sundries, | 4,705,382 |
| Total, | 16,699,382 tons. |

To show how small this traffic is relatively to the total carried, the following items in the consumption of the people of this island, in tons, may be noted:—

| | |
|---|---|
| Corn, | 3,000,000 |
| Potatoes, | 3,000,000 |
| Sugar, | 300,000 |
| Tea, Coffee, and Tobacco, | 50,000 |
| Malt, | 400,000 |
| Spirits, | 100,000 |
| Paper, | 40,000 |
| Soap, | 90,000 |
| Candles, | 100,000 |
| Cotton Goods, | 250,000 |
| Woolens, | 100,000 |
| Linens, | 100,000 |
| Iron, | 1,600,000 |
| Glass, | 40,000 |
| Coals, | 30,000,000 |
| Salt, | 650,000 |
| Timber, | 2,000,000 |
| Total, | 41,720,000 tons. |

This enumeration of 41,720,000 tons is under the mark, and only gives the total consumption of this island, reckoning the articles as only carried one way, and not including many articles of agricultural produce: manures, leather (60,000), fish, stone, lead, copper, earthenware, oil (60,000), fruits, &c.; bark, 50,000; dyestuffs, 70,000; hemp, 50,000; cabinet woods, 30,000; rice, 20,000; tar, 20,000; turpentine, 20,000, &c. The railways at present do not carry more than a fourth of the traffic of the country, if so much.

*No.* 26.—*Average Rate and Mileage.* It is of some importance for engineers to know the average distance that each class of produce is carried, and the average receipts, which are far below what is believed.

*Passengers.*—The average mileage of all the passengers in 1847 was 16 miles,* and the average receipts 2*s.* The average receipt on the London and North Western is 4*s.*; Great Western, 4*s.* 9*d.*; Midland, 2*s.* 7*d.*; South Eastern, 1*s.* 6*d.*; Brighton, 2*s.* 4*d.*; Eastern Counties, 3*s.*; South Western, 3*s.*; and Lancashire and Yorkshire, 1*s.* 4*d.*

*Beasts.*—The average receipts for beasts on the London and North Western is 42*d.*, miles 57; Eastern Counties, 68*d.*, miles 75; Great Western, 34*d.*, miles 45.

*Sheep.*—London and North Western, 10*d.*, miles 70; Eastern Counties, 9*d.*, miles 75; Great Western, 10*d.*, miles 66.

*Swine.*—London and North Western, 18*d.*, miles 120; Eastern Counties, 6*d*, miles 58; Great Western, 12*d.*, miles 75.

*Coals.*—York and Newcastle, 16*d.*; Stockton and Darlington, 18*d.*; Midland, 27*d.*; London and North Western, 20*d.*

*Ironstone.*—Ballochney, 9*d.*; Taff Vale, 28*d.*, miles 25.

*Limestone and Lime.*—Midland, 22*d.*; Newcastle and Carlisle, 20*d.*, miles 16; York and North Midland, 14*d.* miles 9.

*Building Stone.*—York and North Midland, 24*d.*, miles 24; Midland, 20*d.*; Newcastle and Carlisle, 22*d.*

*Sand.*—Bodmin and Wadebridge, 24*d.*, miles 8.

*Fish.*—York and Newcastle, 21*s.*, miles 50; Norfolk, 13*s.*, miles 68; Whitby and Pickering, 9*s.*, miles 25.

*Parcels.*—Average of enumerated lines, 3·9*d.*

*Horses.*—Average of all lines, 16*s.*

*Carriages.*—Average of all lines, 25*s.*

*No.* 27.—*Horse Traffic.* The charge for horses per mile is, London and North Western, 3*d.*; Great Western 5·4*d.*; Midland, 4·25*d.*; Eastern Counties, 3·6*d.*

Many day-tickets are taken out for horses on the London and North Western and other lines, by persons going out hunting.

*No.* 28.—*Carriage Traffic.* The average charge per mile is, on the London and North Western, 4*d.*; on the Great Western and Midland, 6*d.*

*No.* 29.—*Dog Traffic.* Dogs are enumerated only in a few returns. The average rate per mile is ½*d.* The number carried in 1847 on the South Devon line was 1086, £34; on the Maryport and Carlisle, 336, £51; and on the Whitehaven, 230.

* See a valuable paper by Mr. Wyndham Harding, read before the British Association, at Swansea, and since re-published.

*No.* 30.—*Carrying-Stock.* The following is an enumeration of the carrying-stock of the London and North Western Railway in 1848, suitable for special traffic:—Horse boxes, 210 (horses carried, 27,715); carriage trucks, 217 (carried 8790); bullion vans, 9; post offices, 8; ditto tenders, 13; milk trucks (north division), 2, convict van, 1; cattle wagons, 495 (cattle, 161,171); sheep wagons, 117 (sheep carried, 399,998); coal wagons, 653 (440,000 tons); timber trucks, 12; powder magazines, 4; iron trolléys, 4.

*No.* 31.—*Manchester and Sheffield.* The following, communicated by the kindness of Mr. Meadows, Secretary of the Company, gives some particulars as to the traffic of the Manchester, Sheffield, and Lincolnshire Railway:—

*Analysis of Merchandize Traffic.*

| Date. | Coal. | Stone. | Sheffield Goods. | Flour and Grain. | General Goods. | Total. |
|---|---|---|---|---|---|---|
| 1848. | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| March, | 12,334 | 6,176 | 1,791 | 1,159 | 5,550 | 27,010 |
| April, | 9,689 | 7,530 | 1,884 | 1,618 | 4,698 | 25,419 |
| May, | 8,673 | 8,561 | 2,262 | 2,663 | 5,443 | 27,602 |
| Total, | 30,696 | 22,267 | 5,937 | 5,440 | 15,691 | 80,031 |

Civ. Eng. & Arch. Journ., Dec. 1848.

---

*On the Component Parts of the Crust or Fur in Boilers.* *By* Mr. Wm. West. *Read before the West Riding Geological and Polytechnic Soc.*

It has been common to speak of bicarbonate of lime, or carbonate of lime dissolved in water by excess of carbonic acid, according to the opinions on a theoretical point of authors describing the same substance, as yielding the crust or "fur" of steam boilers; and either to deny or overlook the share which *sulphate* of lime has in the formation of this troublesome deposit. Among those who have gone so far as to deny the existence, or, at least, the practical importance, of sulphate of lime in these crusts, is Dr. Ritterbandt, the proprietor of a very ingenious, and, I believe, in some situations, a very effectual patent method for preventing incrustations of the carbonate, by introducing chloride of ammonium into the boiler. At that temperature carbonate of ammonia is driven off, and the highly soluble chloride of calcium remains, in place of insoluble carbonate of lime. I have, however, so often found in these crusts not merely a notable, but a considerable, portion of sulphate of lime, that I have on different occasions, when my subject required, called attention to its presence, and expressed an opinion, which I have found much to confirm, that it is even more troublesome and mischievous than the carbonate alone.

The specimen now treated of was formed, under somewhat peculiar circumstances, in a low-pressure boiler. It contains not a trace of carbonate, yields not a bubble of effervescence with acids, and a portion dissolved in a large quantity of water yields, with chloride of barium, a quantity of

sulphate of barytes, closely equivalent to what it would furnish if pure anhydrous sulphate of lime. It contains a little oxide of iron. It is not the curious salt discovered by Professor Johnstone, containing half an atom of water to each atom of sulphate of lime; for ten grains, finely powdered, lost by exposure to a red heat only three-tenths of a grain—less than a quarter of an atom of water, and, therefore, hygrometric or accidental; and the sulphate is essentially anhydrous. The deposition of sulphate of lime from a solution, far below saturation, takes place in the manner which I described some years ago in the Journal of the Royal Institution. As each bubble of steam is disengaged during brisk ebullition, the sulphate of lime, of course, separates; for its re-solution time would be required, but before that can take place many other particles are separated, and these rapidly cohere into portions large enough to subside, and to resist yet more the solvent power of the water.

I have elsewhere, and on other occasions, stated my belief that though gypsum, in its hydrous and ordinary crystals, is a softer mineral than calc spar, yet that boiler crusts containing much sulphate of lime are harder than those composed wholly or chiefly of carbonate. The present specimen curiously confirms this opinion. I am assured by the workmen, that not only was it with difficulty removed by the tools usually employed for such purposes, but that even the "sate," or hard chisel, used for cutting cold iron, is sometimes broken or turned by this crust. Ibid. June, 1849.

---

### *The Floating Railway Bridge for the Frith of Tay.*

This novel and extraordinary piece of naval architecture has had her engines fitted at Mr. Napier's dock, at Lancefield. She lately made an experimental trip down the river to Greenock and back. The vessel is of iron, 175 feet long, 34 feet broad, and 10 feet deep, the bottom being a very flat curve; both ends are alike and quite square, so as to abut against the quay, and receive the trains on deck from either end. The deck is flush and clear fore and aft, and on it are three lines of rails, so as to enable it to take the longest train likely to require it. The steering wheel is amidship, elevated between the paddle-boxes, and connected with the rudders at each end by long chains; as the vessel will not be turned, these rudders will, of course, be used alternately, as either end becomes the stern. There are two engines entirely independent of each other, and instead of a shaft connecting the paddles, each is moved solely by one engine, by which means extraordinary command is obtained over the movements of the gigantic machine, independent of the rudders. The diameter of the cylinders is 56 inches, with a 3 feet 6 inches stroke; the valves work with great ease, and each engine is 100-horse power. The valve gear is on deck; there are two eccentrics which are thrown alternately in and out of gear, as either end of the vessel becomes in turn the head. The boilers are amidships, with a clear space all round for facility of cleansing and repairs. She draws but little water, made eight knots per hour, and is expected to be in operation in two months. There are two small extra pumps for supplying the boilers, in case of the water running low, and every precaution appears to have been taken to prevent accident. Ibid.

*Description of the Camden Station of the London and North Western Railway.* *By* Mr. R. B. Dockray, *M. Inst. C. E.*

In the first design of the railway, in 1833, this station was intended for the sole terminus of the line, and, after much discussion, thirty acres of ground were purchased, although that quantity was considered preposterously large. A very short time demonstrated the necessity for the establishment of the Euston Station solely for passengers; and fourteen acres were there secured, and ultimately covered with buildings. The whole station at Camden was then devoted to goods and cattle; and although in the original design great care was taken to anticipate the wants of the traffic, yet such has been the rapid development of the railway system, that in the space of ten years it has proved necessary to sweep away almost every vestige of the original constructions, and entirely to remodel the station. These changes have been partly produced by the increase in the goods traffic, which was first undertaken by the great carriers, who built large warehouses on the Company's land. The whole system has, however, been reformed, and the Company do all that business, and are responsible to the public for the due performance.

As the increase of the traffic progressed, the trains in the sidings frequently became of such length as to cause danger to the passenger trains; it therefore became necessary to alter the whole disposition, which has been so done, as now to give a length of double line of two thousand five hundred feet, for the goods wagons only, entirely clear of the main line.

Another reason for the alterations was the demand by the public for a more rapid rate of traveling; this demanded heavier and larger engines, and necessitated wider buildings and larger turn-tables; in fact, everything required to be re-modeled;—and the results of all these changes were shown in detail in the paper and the illustrating drawings.

The circular engine-house, one hundred and sixty feet diameter, to contain twenty-four engines and tender, with a central turn-table, forty-one feet in diameter, and an iron roof, was excellently described; as were also the other engine-houses, stores, warehouses, sheds, &c., with their appurtenances; and among the external works, the new wrought iron bridge, at Chalk Farm, on Mr. R. Stephenson's box-girder principle, and the wooden lattice bridge over the Regent's Canal.

The supply of water for the locomotive engines was then treated of at some length, and exhibited some curious anomalies. The only water that could originally be used, was taken from wells at Tring and at Watford; an attempt was, however, made to obtain a supply at Camden station, first from the Regent's Canal, and then by sinking a well down one hundred and forty-five feet into the chalk, or to a total depth of three hundred feet below Trinity high-water mark. The water from the sand stratum was excluded, and although only that from the chalk was pumped up, which ought to have possessed the same qualities as the water at Tring and Watford, derived also from the chalk, yet it was found to cause the locomotive to "prime," or flush water through the cylinders, with the steam, to such an extent as to seriously impede the progress of the trains. This was shown, by analysis, to arise from the excess of carbonate of soda contained in this

well water, which there was an entire absence of in the waters of the wells at Tring and at Watford.

The well, therefore, became useless for the engines, but the water was so excellent for household and other purposes, that it has been employed for the general uses of the station, and for the hotels and houses belonging to the Company.

Some idea of the extent of the station was given by the statement, that the length of single line of railway, exclusive of the main lines, exceeded twelve miles. There were one hundred and twelve sets of points, one hundred and ninety-six turn-plates, and one hundred and ten cranes, varying in power from one ton and a half to twenty tons. The area of goods sheds was upwards of one hundred and thirty-five thousand superficial feet, and that of the platforms was thirty thousand feet.

The annual consumption of gas exceeded six millions of cubic feet.

The discussion that ensued turned chiefly on the causes of the excess of alkalinity in the water at that spot, and it was suggested that it might be owing to the rapid filtration of surface water through a crevice in the chalk upon which that well had been sunk; and, as a cure for the "priming," it was suggested to try a minute quantity of sulphuric acid to neutralize the alkali. There appeared, however, to be a question whether the water from the green sand was really completely excluded.—*Proc. Inst. Civ. Eng.* Glasgow Prac. Mech. Journ., April, 1849.

---

*Observations made on the Initial and Terminal Velocities of Trains in Descending Inclined Planes. By* Capt. W. Moorson, *M. Inst. C. E.*

The observations were 82 in number, and were made during the ordinary passing of trains on the Waterford and Kilkenny Railway, the gauge of which is 5 feet 3 inches, over two adjoining inclines, each falling at the rate of 1 in 100 for upwards of 1½ miles, with a short intermediate level between them.

The speeds at which the descent was begun varied from 20 to nearly 44 miles per hour, and the loads varied from 32 to 94 tons.

One of the planes presented, for the greater part of its length, two curves of a radius of 1¼ and 1½ miles respectively, and the other plane was straight for part of its length, but contained a curve of 2½ miles radius. The general results in the more curved plane were, that initial velocities of 20 to 30 miles per hour, at the top of the plane, became terminal velocities of 24 to 28 miles per hour; and on the straighter plane, the same initial velocities became terminal between 29 and 31 miles per hour. Again, on the more curved plane, initial velocities between 30 and 40 miles per hour, became terminal at velocities between 29¾ and 31½ miles per hour; and on the straighter plane, the same initial velocities became terminal at 30¾ to 33½ miles per hour.

Initial velocities above 40 miles per hour were noted only upon the more curved plane, and became terminal at 30 to 31 miles per hour. There did not appear to be any constant proportion between the load in motion and terminal velocity; but the latter appeared to be dependant more upon initial velocity than upon the weight or character of frontage of the trains.

The general practical conclusion was deduced, that the question of gauge had little or nothing to do with terminal velocity derived from gravity, and that the views generally entertained by engineers during past years, of the great resistances experienced by trains at high velocities, were borne out by the observations recorded in the paper.—*Proc. Inst. Civ. Eng.*

Lond. Min. Journ., No. 721.

---

### *The Britannia Bridge over the Menai.*

The abutments, on either side of the Straits, are huge piles of masonry. That on the Anglesey side is 143 feet high, and 173 feet long. The wing walls of both terminate in splendid pedestals, and on each are two colossal lions *couchant*, of Egyptian design, lifting their limestone foreheads in the face of every train. These lions, like the tube they adorn, are on a gigantic scale, each being 25 feet long, 12 feet high, though crouched, 9 feet abaft the body, and each paw 2 feet 4 inches. Each weighs 30 tons.—There is some intention of surmounting the central tower with a colossal figure of Britannia, 60 feet high. The towers for supporting the tube are of a like magnitude with the entire work. The great Britannia Tower in the centre of the Straights is 62 feet by 52 feet at its base; its total height from the bottom, 230 feet; it contains 148,625 cubic feet of limestone and 144,625 of sandstone; it weighs 20,000 tons, and there are 387 tons of cast iron built into it in the shape of beams and girders. Its province is to sustain the four ends of the four long iron tubes which will span the Straights from shore to shore. The total quantity of stone contained in the bridge is 1,500,000 cubic feet. The side towers stand at a clear distance of 460 feet from the great central tower; and again, the abutments stand at a distance from the side towers of 230 feet, giving the entire bridge a total length of 1849 feet, corresponding with the date of this present year of grace. The side or land towers are each 62 feet by 52 feet at the base, and 190 feet high; they contain 210 tons of cast iron.

*Tubes of the Britannia Bridge.*—The length of the great tube is exactly 470 feet, being 12 feet longer than the clear space between the towers, and the greatest span ever yet attempted. This additional length is intended to form a temporary bearing of 6 feet at each end, after they are raised into their places, until there is time to form the connexion between them across the towers. Their greatest height is in the centre 30 feet, and diminishing towards the end to 22 feet. Each tube consists of sides, top, and bottom, all formed of long, narrow wrought iron plates, varying in length from 12 feet downward. The direction in which these plates are laid down and riveted together is governed by the direction of the strains on the different parts of the tubes. They are of the same manufacture as those for making boilers, varying in thickness from three-eighths to three-fourths of an inch. Some of them weigh nearly 7 cwt., and are amongst the largest it is possible to roll with any existing machinery. In the sides the plates are 6 feet and 8 feet long, and half an inch thick; but the longest plates are in the bottom, being 12 feet long by 2 feet 4 inches wide, arranged in double layers. At the top they are 6 feet in length and 1 foot 9 inches in breadth. The connexion between top, bottom, and sides, is

made much more substantial by triangular pieces of thick plate, riveted in across the corners, to enable the tube to resist the cross or twisting strain to which it will be exposed from the heavy and long continued gales of wind that, sweeping up the Channel, will assail it in its lofty and unprotected position. The rivets, of which there are 2,000,000,—each tube containing 327,000,—are more than an inch in diameter. They are placed in rows, and were put in the holes red-hot, and beaten with heavy hammers. In cooling they contracted strongly, and drew the plates together so powerfully, that it required a force of from 4 to 6 tons to each rivet to cause the plates to slide over each other. The total weight of wrought iron in the great tube is 1600 tons. The trains will pass through over the Straits at 100 feet above high water. Lond. Athen., June, 1849.

—

*Accident at the Britannia Bridge.*—A letter in a Liverpool paper, from Bangor, England, August 17th, 1849, says:—

"All hopes of raising the monster tube of this stupendous bridge to its final resting place, are, for the next two months at least, suspended. A few minutes before noon of this day, the lower part of the cylinder of the huge hydraulic press on the Anglesey side burst with a tremendous explosion, and in its descent to the tube, a height of 84 feet, fell with a terrific crash. The press was at work at the time, and had raised the tube about three feet during the lift this day; and had it not been for the precautionary means adopted, by packing and bricking under with cement as the tube was raised, the most dreadful consequences were inevitable. One of the workmen was precipitated from a rope ladder, running from the top of the tube to the recess in which the hydraulic machine was fixed; he was struck by the huge mass of iron in its descent, weighing nearly three tons, and now lies in a dreadfully crushed state. I fear that he cannot survive many hours, as the medical attendant on the works considers that, on an examination of his body, most of his limbs must be fractured, as well as suffering from dreadful internal contusions. This disastrous affair is to be attributed entirely to a defective coating of the cylinder, and the raising of the tube will consequently be delayed some time, until the completion and fixing of the new one in its place. The tube is now raised about 21 feet from its base."

---

*Notice of Dr. Sleigh's Patent for Preventing Accidents on Railroads.*

The first part of the invention consists in the application of oblique pressure to the rails, by means of a short lever of the second order, acting on a toggle or hinge joint, similar to that used in the Stanhope printing press, by means of which one person can, at will, command, instantly or gradually, a resisting force equal to many tons. Moreover, this is so constructed that the rails cannot be displaced or broken; for according to the principle of the revolution of force, a definite proportion of the force (depending upon the angle of the joint) will act at a right angle on the rails, holding them down; while a bar of iron only an inch square, called the guard, and which it would take 27 tons to tear asunder, protects them on the outside. Nor

can the carriages be lifted off the rails by it, for the fulcrum of the lever will never have on it one-half the weight of the carriage, and that although 20 tons pressure be applied to the rails. It is proposed to attach this apparatus, which cannot cost more than £10 for each train, to the last carriage; for when a train is suddenly stopped by an impediment in front, it is the last carriage, retaining the momentum it had acquired, (the front carriage being deprived of it,) dashes on, smashing those in front; but when the last carriage is the first stopped, after the actual moving power is cut off, this can never occur.

This invention does not entail the necessity of making any alteration in the rails or carriages, except the luggage one, (to which the apparatus may be attached for a mere trifle,) nor is it intended to supersede the use of the ordinary brakes on ordinary occasions; its great merit being that it is adapted to do that which the means at present employed are incapable of accomplishing. As tested by the model, the invention is perfectly successful and extremely well adapted to the purpose for which it is designed; but its efficacy, when applied in its full force with the enormous power and speed of a train of carriages opposed to it, of course remains to be proved.

Ibid.

---

*On the Employment of High Pressure Steam, Working Expansively, in Marine Engines. By* Mr. J. Seaward.

This communication was described to be the substance of a reply, by the author, to questions asked by the Secretary of the Admiralty. It first reviewed the mode of working marine engines for some years past; and noticed the gradual change that had occurred,—particularly the tendency to use high pressure steam instead of that of a pressure of about four pounds above the atmosphere. It then examined the system of cutting off the steam at various parts of the stroke; and as at the same time a remarkable augmentation had occurred in the speed of the vessels, which was naturally attributed to that cause, it inquired into these several causes and effects, as well as into the reduction in the consumption of fuel which took place. In this examination, all the arguments for and against the use of high steam, and on the presumed gain or loss of mechanical power in the use of the expansion principle in the cylinder, were canvassed; and the paper wound up with the replies of the author to the three questions from the Admiralty, to this effect:—

"The highest pressure of steam that we have, in any case, put upon a marine boiler of our own construction, was about 16 lbs. to the square inch; but we are not inclined to repeat the experiment, as we feel assured that we can obtain equally good results with steam of a lower pressure. From 10 to 12 lbs. is the usual pressure we employ in the merchant service for engines and boilers of comparative small power. The steam pressure at present employed in the service is about 8 lbs. per square inch. We consider steam of this pressure to be well adapted for the exigencies of the service; we believe it is calculated to secure all the important advantages of power, economy of weight and space, in a very eminent degree; these advantages will, in some respects, be slightly increased by

augmenting the steam pressure to 10 or 12 lbs. to the square inch. We strongly recommend that the steam employed in the navy should not be of greater pressure than 10 lbs. per square inch, or, in extreme cases, 12 lbs. to the square inch; any material increase to the latter pressure will be attended with considerable risk, without any adequate advantage."

In the discussion which ensued, these propositions were to a certain extent concurred in, but with limitations as to the introduction of other forms of boilers; and it was explained that the arguments were applicable only to condensing engines working expansively, and therefore left the question of the introduction of the use of high pressure non-condensing engines quite untouched and free for discussion at a future period. Ibid.

## AMERICAN PATENTS.

*List of American Patents which issued in the month of January*, 1849, *with Exemplifications by* CHARLES M. KELLER, *late Chief Examiner of Patents, in the U. S. Patent Office.*

1. For an *Improvement in Shower Baths;* Ephraim Larabee, Baltimore, Maryland, January 2.

Claim.—"What I claim, is the combination of a movable reservoir with a jet bath, constructed as described."

2. For an *Improvement in Manufacturing a Circular Plate, or Cutting a Circular Aperture in Sheet Metal;* Joseph F. Flanders, Newburyport, Massachusetts, January 2.

Claim.—"What I claim as my invention, is the combination, in one frame, of a set of cutting dies and one or more sets of beading or edging dies, so applied together, and to the frame, as to permit of the easy insertion of the plate at the commencement of the cut or any part of it, and so that the plate or sheet of metal may be operated upon simultaneously by both beading and cutting dies, when the frame is revolved on its spindle."

3. For an *Improvement in Forming Hubs of Carriage Wheels and Attaching them to Axles;* J. R. D. Munson, Williston, Chittenden county, Vermont, January 2.

Claim.—"What I claim as new, is the employment of the solid cap and circular nut, combined and arranged as described."

4. For an *Apparatus for Anti-Friction Boxes;* Thos. Hopper and Thos. Garrison, New Brunswick, Middlesex county, New Jersey, January 2.

The patentees say,—"The nature of our improvement consists in arranging around a journal suitable for the purpose intended, a series of wheels which we denominate blocks, that traverse around a stationary including cylinder, which is connected with the frame in any of the usual

ways; the exterior surface of the journals and blocks, and also the interior surface of the cylindrical bearing, being grooved, so as to form what are generally called mitre teeth, the two faces of which are at right angles, or nearly so, with each other."

Claim.—"What we claim as new, is, 1st, supporting the box or journal upon the series of mitre-grooved rollers or blocks, working into similar grooves on the journal and bearing, said rollers being without journals."

---

5. For an *Improvement in Draws for Railroad Viaducts;* Joseph Ross, Ipswich, Essex county, Massachusetts, January 2.

Claim,—"What I claim as my invention, is a draw constructed on two or more parallel turning frames or timbers."

---

6. For an *Improvement in Corn and Seed Ploughs;* Abner Leland, Milton, Northumberland county, Pennsylvania, January 2.

The patentee says,—"The nature of my invention and improvement consists in shaping the shares so that they will serve the treble purpose of making furrows in which to plant seed, covering the seed, and pressing down the soil with which it is covered. Also, in arranging the tongue by which the horses draw, so that it can be made to project from the narrow or the wide end of the plough, at the option of the operator, by which means the narrow end of the plough can be carried forward, and the soil turned from the centre outward, so as to form a deep wide furrow or ditch, or the wide end can be placed in front, and the soil turned from the sides to the centre, so as to make a broad ridge. Likewise in attaching to the share a removable landside."

Claim,—"What I claim as my invention, is the construction of the removable landsides with wings, in combination with shares made without either bosses, loops, or other projections, upon the sides, that could interfere with their being turned bottom-side up, and attached to the shanks in that position, or obstruct their action when thus turned; the landsides and shares, so constructed, being connected together by one or more screw-bolts, or by other analogous means."

---

7. For an *Improvement in Ploughs;* Jesse Layman, Lebanon, Warren county, Ohio, January 2.

The patentee says,—"The nature of my invention and improvement consists in constructing the share and the lower portion of the mould-board, and the landside, in one piece, the upper part of the mould-board being joined thereto by rivets, screw-bolts, or otherwise, and combining with the mould-board, share, and landside, thus constructed, a winged, double-edged coulter, which can be used either as a coulter, or as an auxiliary mould-board and share, as circumstances might render it advisable. By this means the plough is applicable to making deep furrows, as in summer fallowing, or to stirring up superficially a wide furrow, as in cultivating the soil between rows of corn. When deep furrows are made, the strain upon the point of the plough is greatest, and to give the plough the requi-

site strength for this operation, to resist the increased strain, the coulter is turned up and firmly screwed to the beam, which thoroughly braces it."

Claim.—"What I claim as my invention, is the combination of the adjustable hinged and winged coulter with the mould-board, landside, and beam. I also claim the combination of the auxiliary mould-board with the principal mould-board and adjustable coulter."

---

8. For an *Improvement in a Turning Lathe for Wheels;* Arunah S. Macomber, Bennington, Bennington county, Vermont, January 2.

The patentee says,—"The nature and principle of my invention consists in placing the box to be turned or rimmed out, on a lathe within a revolving chuck, through which passes a fixed spindle with a cutter attached to it, and connecting the said chuck and stock head to a saddle, which, by a slot or slots therein, and pivots or centres connecting the said saddle to the slide, allows the saddle, poppet head, and chuck, to be set at any angle with the cutter on the spindle, whereby boxes of any required taper may be cut or rimmed out, as the chuck revolves around the cutter and moves with the slide."

Claim.—"What I claim as my invention, is the saddle, constructed with a slot or slots, combined with pivots or screws, or swivels, and with another slot or slots in the flanch below, whereby the said swivels will act as centres or swivels, for the saddle to be moved either transversely or set at any angle with the point of the cutter on the fixed spindle, so that when the box and chuck revolve round the cutter, and with the slide as it moves horizontally on the bed of the lathe, boxes for carriage and other wheels may be turned or rimmed out of any required interior taper."

---

9. For an *Improvement in Manufacturing Lamp Black and Coldphone, and Calcining the Lamp Black;* Edward Clark, Brooklyn, Kings county, New York, January 2.

The patentee says,—"The nature of the first part of my invention consists in producing by one and the same operation lamp black and coldphane, by the distillation or decomposition of common rosin in heated iron retorts, and by the inflaming of a part of the products of the distillation to produce the lamp black, and thus leave the other constituent or portion of the substance to distill over in the form of coldphane. The second part of my invention, which relates to the apparatus in which I apply my improved process, consists in combining the chamber in which the lamp black is deposited, and the coldphane receiver, with the retort in which the rosin is decomposed, when the said retort is provided with a beak having burners for the burning of the inflammable gas evolved, to produce the lamp black, and a pipe through which the coldphane is conducted or delivered into the receiver. And the last part of my invention consists in combining with the burners on the beak of the retort in the lamp black chamber, a rotating hollow cylinder, into which lamp black can be placed to be calcined."

Claim.—"What I claim as my invention, is the manufacture or production of lamp black and coldphane by one and the same process of decom-

posing rosin. I also claim as my invention, in the apparatus for the manufacture or production of lamp black and coldphane, the combination of the lamp black chamber, and the coldphane receiver, with the retort provided with the burners for inflammation, and the pipe for the delivery of the coldphane. And finally, I claim the hollow cylinder for the calcination of lamp black, in combination with the burners in the lamp black chamber."

---

10. For an *Improvement in Screw Wrenches;* Frederick H. Bartholomew, City of New York, and Solomon Merrick, Springfield, Hampden county, Massachusetts, January 2.

Claim.—"What we claim as our improvement in this wrench, for the purpose of holding and turning cylindrical substances, is the combination of the lever with the main bar of the wrench, also with the slide, the nut, and the spring."

---

11. For an *Improvement in Making Wrought Iron Tubes;* James M'Carty, Reading, Berks county, Pennsylvania, January 9.

The patentee says,—"The nature of my invention consists in combining with the finishing rollers a mould or former for receiving the skelp from said rollers, and, by means of the form of said mould or former, gradually bending the skelp into a suitable form for welding into tubes."

Claim.—"What I claim as my invention, is the construction and arrangement of the mould, in combination with the finishing rollers of a common rolling mill."

---

12. For an *Improvement in Journals and Axles;* Charles Chinnock, City of New York, January 9.

Claim.—"What I claim as my invention, is the confining an axle or journal within a box by means of a spherical ball or balls running in a channel made partly in the journal and partly in the box."

---

13. For an *Improvement in Heading Rivets, Bolts, Spikes, and Nails;* Jonathan Beardsley, Trenton, Mercer county, New Jersey, January 9.

Claim.—"What I claim as my invention, is the combination of the carriage and punch holders with the roller or its mechanical equivalent, by means of which the spike is hook-headed by a single motion."

---

14. For an *Improvement in Producing Music;* Adoniram F. Hunt and Jas. A. Bradish, Warren, Trumbull county, Ohio, January 9.

Claim.—"What we claim as our invention, is the making and application of detached sheets, plates, or theorems, prepared by perforating, indenting, or otherwise adapting them to operate hammers, weights, keys, valves, levers, wires, or springs, to produce music or musical tones, using for the said sheets, plates, or theorems, any metal or material which will produce the intended effect. We also claim the right to hook or catch the ends of the said sheets, plates, or theorems together, so as to form an end-

less band if required, and the right to use gibs or cams, springs, movable frame, and rollers; the said rollers prepared by grooving, or otherwise adapting them to give motion to said sheets, plates, or theorems, for the purpose of producing music or musical tones, by operating hammers, weights, keys, valves, levers, wires, or springs."

---

15. For an *Improvement in the Improved Corn Plough;* William Richter, Williamsburg, Wayne county, Indiana, January 9.

The patentee says,—"In the use of this improvement the cultivator teeth go before and loosen up the ground, and the corn fender comes after, clears away all the trash and clods from the young corn, and the plough follows after, and lays the fine earth or soil up to the corn without disturbing it."

Claim.—"What I claim as my invention, is the corn fender, in combination with the cultivator teeth and the plough, acting as above."

---

16. For an *Improvement in Making Shears;* Benjamin W. Warner, City of New York, January 9.

The patentee says,—"The nature of my invention consists in attaching the lower blade of the shear to a bar, and making it work in combination with the upper blade by means of a short arm or lever worked by the upper hand lever, by which arrangement the blades are made to act, in cutting, more nearly parallel to each other than those of the ordinary shears, thus increasing the facility of their use, by lessening the spread of their points, and keeping the lower part of the shears constantly in contact with the surface upon which the material is laid to be cut, at the same time that the power of the hand is applied more equally on the whole blade than in any other plan hitherto in use."

Claim.—"What I claim as my invention, is the construction of the lower blade separate from the upper lever and jointed to it."

---

17. For an *Improvement in Gathering and Securing Vines for Forage;* John B. Stanley, Copiah county, Mississippi, January 9.

Claim.—"What I claim as my invention, is the mode of securing vines in a green state, by putting them up in hollow rolls, and also the apparatus for gathering vines and forming such rolls."

---

18. For an *Improvement in Making Hats;* Adrian Bancker and Charles F. Alvord, City of New York, January 9.

The patentees say,—"Our invention, discovery, or improvement, consists in substituting for the ingredients usually employed, a solution of gutta percha, prepared in any usual manner, for the purpose of stiffening the body of the hat."

Claim.—"What we claim as our invention, is the application of a solution of gutta percha, for the purpose of stiffening hat bodies, and uniting the plush or other cover to the body, as a substitute for shellac, glue size, and seed lac, or other articles hitherto used for such purposes."

19. For an *Improvement in Extracting Teeth;* Enoch Osgood, Bangor, Penobscot county, Maine, January 9.

The patentee says,—"The nature of my invention consists in so adjusting an instrument as to insure certainty in the operation of extracting teeth, and of preventing pain, by protecting the surrounding parts from injury."

Claim.—"What I claim as my invention, is a compound fulcrum, partly concave and partly convex, of which the former rests upon the surrounding teeth, and the latter upon the tooth to be extracted."

---

20. For an *Improvement in Coating Telegraph Wires;* Benjamin H. Green, Princeton, Mercer county, New Jersey, January 9.

Claim.—"What I claim as my invention, is the construction of an apparatus for aiding in the painting or coating of telegraph wires, (or for other purposes,) by the combination of rotating and stationary brushes, and suspension pulleys or their equivalents, with a portable receptacle for paint or other coating matter, not intending by this claim to limit myself to the particular form, number, and arrangement, of the parts composing the apparatus, for aiding in the painting or coating telegraph wires, but to vary the same as I may deem expedient, whilst I attain the same end by means substantially the same."

---

21. For an *Improvement in Making Cores and Moulds for Casting Metallic Pipes and Tubes;* Chapman Warner, Louisville, Jefferson county, Kentucky, January 9.

Claim.—"What I claim as my invention, is, 1st, the improvement in the core tube, caused by screwing it by a longitudinal slit, to allow of compression as the metal contracts in cooling.

"2d, I claim the manner of compressing a coating of sand upon my improved core tube, or upon any core tube or rod, (or the formation of solid sand cores,) by means of sections operating by machinery, one of said sections being stationary, towards which another section is forced in a direction perpendicular to its plane, and the two other sections being forced towards each other, between the two first described.

"3d, In combination with the above mentioned core-box sections, or any other analogous core-forming sections, I claim the (slightly elastic) core-tube, bearing plates and caps, or their equivalents.

"4th, I claim the manner of compressing the sand into a half flask, and giving it the impression of the patterns, by placing the pattern at the base of a forming box and covering it with sand, and then placing the half-flask upon the sand covering the pattern, and forcing it down upon the same.

"5th, I also claim the manner of preserving the cores in a central position within the moulds, by means of concavo-convex skeleton or open stays, formed of thin narrow sheets of metal, and combined with a core and mould."

---

22. For an *Improvement in Drawing Frames for Drawing Cotton;* Charles Danforth, Paterson, Passaic county, New Jersey, January 9.

The patentee says,—"My first improvement relates to the mode of stop-

ping the machine whenever any one of the rovings gives out, that another may be supplied, and thus keep all the parts of the drawing frame equally in action, that each may receive an equal quantity of rovings; and my invention consists in making use of the weight of the rovings, to act on a balance lever guide, which, when liberated by the giving out of any one roving, will fly up and bring an arm in contact with a fly connected with a sliding clutch, that shifts the belt on to the loose pulley, and thereby stops the whole drawing frame until a new roving can be supplied or the old one spliced. And the second part of my invention relates to the employment of a regulated stop-motion, connected with the belt guide, which, at a given time, (determined by the size of the cams and the number of the roving or roping,) will stop the drawing frame, to prevent too great a quantity of roving or sliver from being coiled or packed in the cams. And this part of my invention consists in the use of a flying trigger or cam, on a rotating shaft receiving motion from the main or any other shaft, which, at the end of the operation of the machine, is gradually forced back, and, when liberated, forces out a catch lever that holds the weight or spring lever by which the belt guide is shifted, and at the same time flies beyond the end of the catch lever, that the belt guide may be immediately shifted back to start the machine at once, without waiting for the spur or trigger to have rotated sufficiently far to clear the catch lever, as would be the case, from the necessarily slow motion of the shaft, if the spur was permanently attached to this shaft."

Claim.—"What I claim as my invention, is the method of stopping the operation of drawing frames or drawing heads, by means of guides, each of which is attached to an end of a horizontal balance lever, so that they shall be kept down (to permit the drawing head to operate) by the weight of the roving, and fly up to stop the machine the moment they are relieved of the weight of the rovings. I also claim the employment of a flying trigger, in combination with the apparatus for shifting the belt, or any other substantially the same, whereby the trigger flies past the end of the catch lever, to permit the mechanism that shifts the belt to be re-set without delay."

---

23. For an *Improvement in Filing and Setting the Teeth of Saws;* Presbury Norton and Franklin D. Cottle, Tisbury, Dukes county, Massachusetts, January 9.

Claim.—"What we claim as our invention, is, 1st, the combination and arrangement of the operating file handle, the adjustable standards rising from the turn-table, the adjustable bearing plates, (secured to the standards,) the elastic arm, point, and curved gauge-plate, with each other, and with the saw clamp."

---

24. For an *Improvement in Planting Seed;* B. F. Partridge, Syracuse, Onondaga county, New York, January 9.

Claim.—"What I claim as my invention, is the combination of the index on the axle, and the numbers or marks on the cover of the grain box, with the apertures in the planting plate."

25. For an *Improvement in Wrought Iron Pipes;* Joseph M'Culley, Philadelphia, Pennsylvania, January 9.

The patentee says,—"The nature of my improvement consists in the construction and application of the tongues or dies, through which a flat skelp, after it has been heated, is drawn, to turn it into proper form to be welded into tubing."

Claim.—"What I claim as my invention, are the dies or tongs, formed substantially as herein described, for forming skelps into the proper curve for welding, in the manner set forth."

---

26. For a *Machine for Cutting away Bogs;* John D. Filkins, Lima, La Grange county, Indiana, January 9.

The patentee says,—"The nature of my invention consists in so arranging, in a proper frame work, a set of horizontal steel knives, which are drawn along the surface of the ground, and cut or shove off what are termed bogs from marshy places, thus leaving a clean surface; and also in attaching the middle beam of the aforesaid frame to the rear end of a sled, the front or inclined part of the runners being provided with steel knives, so that, as the machine is drawn along by the team, when the runners come in contact with a bog, the knives will split it and yet keep the machine level and steady."

Claim.—"What I claim as my invention, is, 1st, providing the front or inclined part of the runners of the sled with steel knives, for the purpose above mentioned.

"2d, I claim the combination of the sled with the frame work to which the horizontal knives are attached. And lastly, I claim the combination of the double horizontal knives, resting on the surface of the ground and inclining backwards at an angle of about 45° with the pole."

---

27. For an *Improvement in Railroad Car Wheels;* Linus Dean and Abram Higham, Utica, Oneida county, New York, January 9.

The patentee says,—"The improvement is in the form and construction of the spokes of the wheel, to which is given a complex curved form, both for the strength of the wheel, and to allow a slight contraction in the process of cooling, when cast, without breaking the spoke or other part of the wheel, although the hub is cast whole."

Claim.—"What we claim as our invention, is the peculiar construction of the spoke of the wheel here described, the same being formed of a folded plate, doubling to nearly parallel lines at the hub and expanding towards the rim, uniting to it in nearly a semi-circular form, thus covering and sustaining the rim, while the complex curvature of the spoke (the same being curved in a vertical as well as a lateral direction) allows an expansion and contraction of the metal favorable to the durability of the wheel, and permits it to be cast solid with an entire hub, without cracking."

---

28. For an *Improvement in the Plough and Cultivator;* Herman B. Sinclair, Lyndenville, Orleans county, New York, January 9.

Claim.—"What I claim as my invention, is the method of regulating the draught by a standard, bolt, and regulating set."

29. For an *Improvement in Railroad Car Wheels;* William B. Treadwell, Albany, New York, January 9.

The patentee says,—"My said invention and improvement consists in forming the connexion between the nave or hub and the chilled rim of a cast iron car wheel, all cast in one piece, in such a manner as to dispose of or arrange the metal between the hub and the rim in the strongest mechanical forms, and, as nearly as practicable, in the line or lines of the force to which the wheel is to be subjected in use on railroads, at the same time making sufficient provision for the contraction of the iron in cooling, when the wheel is cast, without danger of fracture or any unnecessary strain upon the parts, in which respect my wheel is preferable to the double and single plate car wheel heretofore in use, and also in avoiding or diminishing the liability of such plate wheels to have the granular texture of the iron composing their plates disintegrated and broken by the swinging and vibratory motion to which they are exposed in use, and also in wholly obviating the danger of cracking around the circumference of the chilled rim between the plates, to which such double plate wheels are liable."

Claim.—"What I claim as my invention, is the combination of the arch piece and the hollow annulus, and the solid annular parts by which the solid hub is connected with the rim and flanch."

---

30. For an *Improvement in Making Cast Iron Car Wheels;* James M. Cook, Taunton, Bristol county, Massachusetts, January 9.

The patentee says,—"The nature of my invention consists in the method or form of constructing wheels for railroad cars, or other purposes, in such a manner as to combine the spoke wheel, the single plate wheel, and the double plate wheel, so that the wheel may be of light weight and possess the necessary strength."

Claim.—"What I claim as my invention, is the constructing of wheels for railroads or other purposes with spokes, single plate and double plate combined."

---

31. For an *Improved Body Supporter;* Henry Mellish, Walpole, Cheshire county, New Hampshire, January 9.

Claim.—"What I claim as my invention and improvement, is the employment of combined serpentine and straight slotted springs with the shoulder straps and back pads; said elastic serpentine springs being formed so as to admit of a more easy, lateral, and twisting motion of the body of the wearer, than can be obtained by the use of the flat dorsal spring as now used, said serpentine springs having likewise a constant tendency to extend themselves longitudinally, which causes them to have a continual upward bearing against the shoulder braces, which relieves the spine of a portion of the weight of the upper part of the body by a constant lifting motion. I likewise claim the manner of constructing the back pads, each with a revolving ring to which the illium spring is attached, and circular notched groove in which the pinion and axle (attached to the ring and illium spring) play round freely during the operation of adjusting the abdominal pad, the teeth of the pinion being constantly engaged with the teeth of the circular

groove, the use of said circular groove allowing the abdominal pad to be changed to a variety of positions, horizontally, vertically, or obliquely. I also claim the manner of constructing the abdominal pad: that is to say, with a hollow revolving plate for the purpose of taking in the spring, and letting it out by a turning plate, and thus graduating its length and pressure upon the inner plate of the abdominal pad, thereby fitting the pad to different protuberances of the abdomen."

---

32. For an *Improvement in Railroad Chill Wheels;* Edward B. Baker, St. Philip's and St. Michael's parishes, Charleston district, South Carolina, January 9.

The patentee says,—"The nature of my invention consists in providing a single plate to connect the hub and rim, the said plate being convex on the inner side, and concave on the outer, with arms curving from the hub to the rim, and reversed to the right on one side of the plate and to the left on the other, thus adding strength and durability to the reverse arm concavo-convex single plate chill wheel."

Claim.—"What I claim as my invention, is the single plate which connects the hub and rim, with curved arms thereon, reversed to the right on one side of the plate and to the left on the other, and likewise my mode of tempering the said wheels, by which all injury to the chill of the wheel is avoided."

---

33. For an *Improved Knitting Needle;* James Hibbert, Providence, Rhode Island, January 9.

The patentee says,—"My invention consists in the application of a latch or tongue, in connexion with the hook of the needle, sweeping freely back and forth upon the centre pin."

Claim.—"What I claim as my invention, is the application of a latch or tongue to the hook of the needle."

---

34. For an *Improvement in Cast Iron Wheels for Railroad Cars and Engines;* Albert T. Converse and Wm. L. Cooley, Norwich, New London county, Connecticut, January 9.

The patentees say,—"Our improvement consists in making a wheel with solid hub, having two sets of arms placed in such position that their outsides are nearly parallel with, and form part of, the sides of the wheel."

Claim.—"What we claim, is the mode of connecting the arms of one side with those of the other side."

---

35. For an *Improvement in Blacksmiths' Forges;* Ephraim Harris, Springfield, Hampden county, Massachusetts, January 9.

The patentee says,—"The nature of my invention and improvement consists in the employment of a perforated ball, in combination with a convex-socketed hearth plate and flanched air chamber, for regulating the fires of blacksmiths' forges, by increasing or diminishing the quantity of air admitted to the fire by simply turning the ball in its socket, which is

effected by means of a handle applied to a rotary shaft, projected horizontally from the convex surface of the ball and forming part of it, a suitable box or bearing being attached to the hearth plate or top of the air chamber in which the shaft turns."

Claim.—"What I claim as my invention, is the employment of a revolving perforated spheroid, oblate at one of its poles, as a rotary central bottom for blacksmiths' forges, in combination with the convex hearth and attached air chamber, performing the combined office of a fire regulator and coal agitator."

---

36. For an *Improved Lubricator for Joints of Machinery, &c.;* P. S. Devlan, Reading, Berks county, Pennsylvania, January 16.

The patentee says,—"This lubricator consists in the mixture of caoutchouc with spirits of turpentine, or other solvent of that gum, carbonate of soda, glue, common animal or vegetable oil, or other cheap fatty matter, and water."

Claim.—"What I claim as my invention, is the combination of ingredients here described, or of others possessing similar properties, and forming an analogous compound, whether the proportions be the same as herein set forth, or varied to any extent that the same may admit of, without changing the peculiar character of the compound as a lubricator."

---

37. For an *Improved Machine for Excavating or Dredging and Removing Obstructions to Navigation in Rivers, Harbors, &c.;* James Callaghan, New Bedford, Bristol county, Massachusetts, January 16.

The patentee says,—"The nature of my invention consists, 1st, in providing suspension movable braces or levers, united by an angle, on which are fixed two grooved shears or pulleys, over which revolving scooping buckets pass on two endless chains; and, in conjunction with the said suspension braces, I provide a vertical sliding frame, attached to the bow of the dredge-boat as the case may be, and to have grooved shears or pulleys on said sliding frame, over which the scooping buckets also pass on the duplicate endless chains, for the purpose of scooping or excavating at any angle, and at any desired depth, by having the suspension braces fixed on the side of the dredge-boat, and kept in such a relative position with the sliding frame as will keep the scooping buckets moving in a horizontal line, or scooping at any angle. 2d, I provide scooping buckets with bottoms capable of being thrown open by a cam fixed on the vertical sliding frame, so that the mud, &c., may be discharged from the buckets at that part of the frame on which the cam is fixed. 3d, I also provide a capstan drum, to surround an upright power shaft, loose on the same, but made to gear with it by a clutch. Around this drum are wound chains, which are attached to the suspension levers, and also to the vertical sliding frame, so that when the levers or frame mentioned are to be elevated or lowered, the said capstan drum is clutched with the power shaft, and the chain or chains wound up or let off, and the levers or frame elevated or lowered, to change the line of draught of the scooping buckets. 4th, I provide scows or tenders, into which the mud, &c., is to be discharged, and pro-

vide said tenders with discharge ports of such depths as will allow said scows and tenders to discharge their mud, &c., in any depth of water, and especially in shallow water or streams, where the tender may get aground, so that the mud may be discharged without waiting for the tide to lift the tender, as is the case with all mud tenders at present in use."

Claim.—"What I claim as my invention, is the vertical sliding frame, to regulate the scooping line of draught, in combination with the suspension levers, whereby the buckets, as they revolve over the pulleys, are made to scoop at any angle at any depth."

---

38. For an *Improvement in Cast Iron Car Wheels;* Samuel Truscott, Columbia, Lancaster county, Pennsylvania, January 16.

The patentee says,—"The nature of my invention and improvement consists in forming the wheels with a combination of curved spokes and arms, of such form and character as to produce a continuous and uninterrupted tie and bracing of all the said curved arms or spokes with themselves, and with the rim and hub, by which intermediate, or auxiliary, or zig-zag rims are formed in the annular space between the hub and the outer rim, and by which the number of the bearing points on the said outer rim is made double those on the hub, making a much stronger and more beautiful wheel than has yet been produced, and which will not be liable to crack in cooling when cast in chills, as is now generally practised."

Claim.—"What I claim as my invention, is tieing and bracing the arms of the wheel together in the annular space between the rim and the hub, forming intermediate, or auxiliary, or zig-zag rims in said annular space, and double the number of bearing points on the rim that there are on the hub."

---

39. For an *Improved Boot Crimp;* Henry Wright, Newcastle, Lincoln county, Maine, January 16.

The patentee says,—"The nature of my invention and improvement consists in providing the back of the boot form with a sliding lever, which extends from the top or upper part of the form downward to the heel of the same, and thence under the foot of said form, to a point at or near the toe thereof; which sliding lever is so constructed that, by turning a thumb screw at the top of the leg of the form, and on the back thereof, this sliding lever leaves the back of the form, opening therefrom, backwards and downwards, with great mechanical force and tension."

Claim.—"What I claim as my invention and improvement, is the method of crimping boot fronts, by means of a sliding lever affixed to an ordinary boot form, on the back and bottom thereof, extending from the top of the form around the heel with a joint, and thence under the foot of the form towards the toe thereof. I claim the combination of the jointed sliding lever, inclined planes, slides, hinge, tie, stop, and the screw as applied thereto."

40. For an *Improvement in Cocks for drawing off and stopping water and other fluids at high temperatures;* John Sheriff, Pittsburg, Allegheny county, Pennsylvania, January 16.

Claim.—"What I claim as my invention, is the wooden stopper, in combination with an expanded recess for its reception, and with a stem entirely unconnected with it, there being a washer between them, so that the stopper may be pressed down upon its seat by the stem without turning."

---

41. For an *Improved Machine for Sawing Clapboards;* Bliss Coiser, Mount Morris, Livingston county, New York, January 16.

The patentee says,—"The nature of my invention, consists in so constructing the carriage and combining it with other parts of the machine, that when the thick plank, or piece of timber of suitable thickness, is placed upon the carriage, and the machine put in motion, it will automatically operate as follows: The portion of the carriage upon which the timber rests will have its side most distant from the saw alternately elevated and depressed, so as to incline the front edge of the timber, in combination with the feed movement, in such a manner that the saw will cut from the timber, at each forward movement of the carriage, clapboards, double the thickness at one edge that they are at the other, their thick and thin edges regularly alternating from the top to the bottom of the piece of timber."

Claim.—"What I claim as new, is the combination of the several parts of my machine, in such manner that it will automatically saw clapboards of the shape herein described, viz., the vibrating frame or adjustable portion of the carriage hinged to the lower portion, the head block, the racks (projecting from the head block), the shaft H, with the pinions *i*, mashing into racks I I; the shaft F, geared to H; the ratchet wheel *b*, and the vibrating lever *d*, connected to shaft F; the pawls on the upper end of *d*, playing into the ratchet wheel *b*; the studs projecting from the rear end of the machine; the leg or supporter descending from the adjustable portion of the carriage; the inclined planes rising from the front end of the vibrating lever L; the tooth projecting from the inner side of L; the ratchet wheel K, secured to the side of the machine; the palls descending from the carriage; the axle *p*, with the tooth *r*, and the balance lever V; the vibrating levers X and Y; the axle *m'*; the toothed wheel Z, and pinion *b'* on *m'*; the pinion *a'* on the shaft J; the pinion *u* on the shaft W, mashing into the rack *z*, on the under side of the carriage; the elastic notched rod *e'*, rising from the front end of lever Y; the retaining pin *h'*, projecting from the side of the machine; the weight *g'*, suspended to the front end of lever Y; the elastic notched rod *f'*, rising from the rear end of lever X; the retaining pin *h''*, projecting from the side of the machine; the weight *g''*, suspended to the rear end of lever X, and the block *t'*, projecting from the under side of the carriage; the above enumerated parts or their equivalents, I claim the arrangement and operation of, substantially as herein set forth.

"I also claim the particular combination of the inclined planes rising from the front end of the vibrating lever L; the tooth projecting from the inner side thereof; the ratchet wheel K; the leg or supporter, descending from the adjustable portion of the carriage; the axle *p*, with its retaining

tooth and balance lever; the pawls descending from the carriage, and the projection from its side, arranged and operating as set forth, for the purpose of producing a regular alternating up and down movement of the outer edge of the adjustable or vibrating portion of the carriage.

"I also claim, in combination with the respective parts for vibrating the upper portion of the carriage, the studs, the vibrating lever, the pawls, the ratchet wheel, the shafts, and the racks connected to the head block, for the purpose of imparting the proper feed motion to the timber placed upon the vibrating portion of the carriage.

"I also claim the combination of the toothed wheel, having internal teeth, and the pinion *b'*, on the same axle, with the pinion *a'*, on the vibrating end of the shaft J, and the weighted levers and spring catches, for the purpose of communicating a slow forward movement to the carriage, and a rapid backward movement thereto."

---

42. For an *Improvement in Harvesting Machines;* Oliver Barr, Aurora, Kane county, Illinois, January 16.

Claim.—"What I claim as my invention, is, 1st, the form of the fixed sickles with the curved edges, in combination with the triangular sickles attached to the vibrating bar, and operated as specified.

"2d, I claim the combination and arrangement of the guide rail with the reel heads, the chain bands, the revolving rake, and the inclined platform, formed and applied as set forth.

"3d, I also claim the combination of the trap-doors, or folding platform, for the purpose of forming and dropping the grain in bundles, with the camb-blocks, inclined wedge, levers and cord, or other similar devices, arranged and operated in substantially the same manner for attaining the same object."

---

43. For an *Improvement in Looms;* A. Bigelow and J. Butler, Granville, Licking county, Ohio, January 16.

Claim.—"What we claim as our invention, is, 1st, the combination of the picker valve, alternator, and slide spring.

"2d, We claim the combination of the picker table, picker arm, picker staff, picker roller, and roller 15.

"3d, We also claim the combination of the marcher, oblique slide, marcher slide, marcher catch, levers 38, catch springs, and heddle guides."

---

44. For an *Improvement in Machinery for Post-Marking Letters, &c.;* Emory N. Moore, Boston, Massachusetts, January 16.

The patentee says,—"The peculiar object of my machine is to imprint on letters or parcels, or other mailable matter usually deposited in post offices, for the purpose of being transported or sent in the mails, the usual post marks, such as the name of the place, date of reception of the letter, and price to be paid for transmitting it, together with the word "paid," or any other word, letter or letters, figure or figures, device or devices, that it may be deemed advisable to stamp thereon. All this has been effected

by stamps used in the hand of some officer of the post office, and, where much business is done in an office, this duty consumes much valuable time, and in consequence thereof, creates a consequent expense. By the use of my machine, many thousand letters may be stamped in a very short period of time, in comparison to what would be consumed were the usual process of accomplishing the same resorted to."

Claim.—"What I claim in my invention for post-marking letters, is the spring grips, as applied in combination with the cylinders and letter conveyor, and to each printing block and bed.

"2d, I claim spring stops and apparatus for working them, as applied in connexion with each endless belt or apron and the spring grips.

"And lastly, I claim to make the beds or printing surfaces or blocks so as to be capable of receding and adapting themselves to letters or parcels of various thicknesses."

---

45. For an *Improvement in Cultivators;* David B. Rogers, Seneca Falls, Seneca county, New York, January 16.

The patentee says,—"The nature of my invention consists in a combination of known mechanical devices and principles of machinery, whereby the frame of the wheeled cultivator, containing the cultivator teeth, can be readily raised above, and carried over, stones and other obstructions in its path, and then immediately lowered again, so as to cause the teeth to plough the required depth of furrows, and by which the cultivator is firmly adjusted to plough the ground at a uniform depth, or to carry the teeth entirely above the surface in turning in the end of the land, and in other situations when it is required that the teeth should not touch the ground."

Claim.—"What I claim as my invention, is, 1st, the mode of raising and lowering the frame containing the cultivator teeth, for the purpose of gauging the machine for deep or shallow ploughing, or for moving it from place to place, without causing the teeth to touch the surface of the earth, by means of the combination and arrangement of the crank axletree, cogged wheel, cogged segment, short axle, lever, and perforated holding plate, in combination with the frame of cultivator teeth and sustaining wheels.

"I also claim the combination and arrangement of the binding and sustaining plates with the transverse beams to which said plates are secured."

---

46. For an *Improvement in Machinery for Making Boxes;* Wilbur M. Davis, Gardiner, Kennebec county, Maine, January 16.

The patentee says,—"The nature of my invention consists in turning out from a solid piece of wood a circular wooden box, turning or cutting a tenon on the same at the same time, and then, by a reverse motion of the same shaft or frame holding the cutters, a cover or lid is turned or cut, chamfering the inner edge at the same time to fit said box."

Claim.—"I do not claim any particular part of the machine as new, but what I claim as my invention, is the combination of well-known principles to effect an object which has not been effected before, which is to turn a box and cover by one operation.

"I also claim the arrangement of the sweep, in combination with the

gauge rods, for varying the length of box and cover, in combination with the ratchet wheels, and the curved and notched rods. I finally claim the whole as a combination of the machine for effecting the object."

---

47. For an *Improvement in Mill Bushes;* Hazard Knowles, Washington City, D. C., January 16.

The patentee says,—"The purpose of my invention is to furnish a bearing for upright shafts, which shall, at all times, keep the joint lubricated, prevent access of dust, and insure constantly the proper contact between the bearing and the neck of the shaft which runs in it; as well as allow for such slight deviations from the perpendicular position of the shaft or spindle as are found unavoidable in practice. The bush must also admit the spindle to be raised or lowered to a certain extent, to allow for a coarser or finer grinding, and for the gradual wearing away of the stones."

Claim.—"What I claim as new, is the constructing and arranging the bush for a vertical spindle or shaft, in such a manner that it will adjust itself to the bearing surface of the spindle or shaft as it or the bush wears away by friction, by making the bearing surface of the spindle or shaft, and the aperture in the bush for its reception, of a corresponding conical form, and so fitting the bush into a supporting frame that it may have free vertical play therein, and be kept in a proper position for bearing upon the spindle or shaft with the requisite force, by means of levers and weights, or their equivalents, substantially as herein set forth.

"I also claim, in combination with a conical self-adjusting bush for vertical shafts or spindles, the oil cup, having inclined revolving lubricators, whereby the necessary quantity of lubricating material is supplied to the bearing.

"I also claim, in combination with a bush frame or cylindrical enclosing support, the use of bushes or bearings for vertical shafts or spindles, with slightly-spherical exterior zones, to traverse the interior of the vertical frame, whereby trifling deviations from a perpendicular position in the spindle may take place without danger of deranging the supporting frame, or the closing plate of the bush that secures the oil from dust, in the manner herein set forth."

---

48. For an *Improvement in Indicating Telegraphs;* L. G. Curtis, Cincinnati, Hamilton county, Ohio, January 16.

The patentee says,—"The basis of the 'American Indicating Telegraph,' invented by me, is upon these principles, viz., electro-magnetism, machinery, figures and signs, and their combinations, all combined so as to produce rapid indications between distant points. This end is obtained by means of a revolving disk or dial plate, marked with successive series of numerals, 0 1 2 3 4, arranged in a circle or otherwise, said dial plate being revolved by degrees as the galvanic current is completed and broken by the alternate vibration of the lever to which the pallets, armature, and springs are attached."

Claim.—"What I claim as my invention and improvement, is, 1st, the mode of conveying intelligence at distances, by means of a revolving

toothed dial plate marked with the several successive repetitions of the series of numerals, 0 1 2 3 4, arranged in a circle on the face of the same, for representing the letters of the alphabet, said dial plate being turned by degrees, as required, by the combination of the escapement, cord and weight, the pallets, lever, and spring, the armature and lever being actuated by the electro-magnet, by breaking and forming the circuit.

"2d, I also claim the peculiar construction and invention of the escapement for actuating the dial plate, consisting of the combination of the pallet bar, the pallets, the triangular teeth; the whole work being confined to the inside, instead of being on the periphery of the wheels, as pallets and teeth of escapements heretofore have been constructed.

"3d, I also claim as my invention, the system of signs, consisting of the combination of the numerals 0 1 2 3 4, for indicating all the letters of the alphabet, and words and sentences, by the use of which, the necessity of having the whole or any part of the alphabet on the revolving disk, and of turning it a revolution, or nearly so, in order to indicate a particular letter, is dispensed with, it being only necessary to turn the dial plate a segment or so of a circle at each combination of figures to indicate a letter, which is done instantly by simply forming and breaking the circuit; and having thus formed the letters, it is evident that words can be spelled with great rapidity."

---

49. For an *Improvement in Cast Iron Plate Car Wheels;* H. Felton, P. D. Cummings, and H. Hinckley, Portland, Cumberland county, Maine, January 23.

The patentees say,—"The principle of our invention is to preserve great strength and compactness in a plate wheel while allowing for shrinkage of the chilled rim. Aware that strength is sacrificed when plates, either plain or convex, are cast connecting the rim with a hub solid throughout, and that a due degree of compactness is wanting when plates unite only the parts of a divided hub, we have taken care to avoid both of these evils, by the manner in which we form our hub. This we form in three portions, tied together by four cross-stays, of which two are in a direction from the axle at right angles to that of the other two. The part of the hub comprised between the two side plates is enlarged to about one-third of the diameter of the wheel, more or less, into three flat circular rings, the middle one of which is connected to that on one side of it by one pair of the cross-stays above described, and with the ring on the opposite side by stays which run at right angles to the directions of the other pair, though lying in different planes."

Claim.—"What we claim as our invention, is the arrangement of cross ties and stays in the interior part of the hub of a plate car wheel, in combination with the expansion disks or rings, whereby those ties which unite two contiguous plates or disks shall alternate with those ties which connect one of said two disks to a third, by which means the elasticity both of the disks and stays is made available to meet the shrinkage of the wheel."

50. For an *Improvement in Rails and Wheels for Turning Curves on Railroads;* J. F. B. Flagg, Philadelphia, Pennsylvania, January 23.

The patentee says,—"The object of my invention is to obviate the friction which at present occurs between the rails and wheels at the curves of railroads. The nature of my invention consists in so forming both the rails and wheels for railroads, that the same freedom of motion is permitted on curves as on the straight parts of the track, when a pair of wheels is placed as usual on the same axle, and both made fast thereto. It also permits the accurate guiding, by the flanches, of the horizontal lateral movement of the wheels, doing away with the swaying surging motion from side to side.

Claim.—"What I claim as new, is the giving to the inner rails on railroad curves a greater breadth than is necessary for the bearing of the wheels thereon, and so sloping the sides inwards towards the middle of the track as to prevent any contact between the slope and the tread of the wheel, while it still serves to guide the flanch of the same, and thus to allow the coning part only of the wheel to travel on the inner rail of the curve. I also claim, in combination with the widened and beveled inner rails of railroad curves, the use of wheels having treads divided into two portions, the one cylindrical, or nearly so, and the other coning."

---

51. For an *Improvement in Cylinders for Carrying and Supporting Cards, &c.;* Stephen R. Parkhurst, West Bloomfield, Essex county, New Jersey, January 23.

Claim.—"What I claim as new and of my own invention, is that constructive arrangement and conjoint application and action of the parts employed, by which metal plates, surrounded by a wire helix and solder, are united to form cylinders of more than usual strength, in proportion to weight, and the application of such cylinders to any mechanical purposes for which they are or may be available."

---

52. For an *Improvement in the Manufacture of Cylinders for Burring Wool, &c.;* Francis A. Calvert, Lowell, Middlesex county, Massachusetts, January 23.

The patentee says,—"The object of my improvement is to produce the cylinders at a much less cost to the manufacturer, while at the same time they are as durable, perfect, and effectual in the production of the desired results, as those now in use; my new method of construction superseding the use of disks of wood, &c., and of any packing between the toothed plates."

Claim.—"What I claim as new, is a cylinder for burring, opening, picking, carding, and performing all other similar operations, on cotton, wool, &c., formed or produced by winding tooth wire, having flanches and teeth, upon the periphery of a metallic cylinder, either in a spiral or straight direction, whether the said wire be fastened thereon in spiral grooves, and properly staked, or by soldering or otherwise."

53. For an *Improvement in Shingle and Stave Dressing Machines;* Elisha Luter, Turnersville, Robertson county, Tennessee, January 23.

Claim.—"What I claim as my invention, is, 1st, the construction and application of the quadrangular wheel with its appurtenances, viz., the rollers and hands; to the uses and purposes above described.

"2d, I also claim the invention of the sliding or vibrating table, and its application, with its appurtenances, to the uses ascribed to them above.

"3d, I too claim the application of the inclined planes to the purpose described above; and

"Finally, I claim the construction and arrangement of the whole machine, taken in combination and applied to the purposes ascribed to them above."

---

54. For an *Improvement in Chucks for Lathes;* William Grant, Boston, Massachusetts, January 23.

The patentee says,—"One of the peculiarities of my chuck is that, without being made proportionably more ponderous than the rest of the lathe, it will be quite as strong and as free from liability to be broken. Its face plate can be slotted like the ordinary chuck-plate, and irregular bodies, whose centre of gravity is eccentric to its centre, can be chucked thereon with the utmost security, by stirrups and T-headed screw bolts, and heavy bodies of any description, when centred by the jaws, may be secured by stirrups and bolts in the ordinary way, to take off the strain from the jaws."

Claim.—"What I claim as new, is the combination of the connecting rods and jaws, jointed together and moving simultaneously, by means of a screw or otherwise, with the chuck-plate; whether the several parts be made and arranged as herein set forth, or in any other substantially similar manner, by which the jaws are moved towards or from the centre of the plate at the same time and at equal speed."

---

55. For an *Improvement in Shower Baths;* James Cortlan, Baltimore, Maryland, January 23.

The patentee says,—"The purposes which I have in view in the invention of this bath are, 1st, by means of suitable elevating apparatus, to enable the bather to raise at once as large a quantity of water as he may desire to use, and thereby to prolong his bathing at pleasure without stopping to replenish the cistern. 2d, By making the whole system of tubes and jets rise and fall with the water receptacle, to adapt the bath to bathe persons of different heights, or to bathe different parts of the same person without extending to the whole body. 3d, By means of separate valves, constantly under the control of the bather, the shower jets or douche may be taken either with full and strong currents, or gently and intermitting, at his option. 4th, By lowering the whole interior apparatus, and letting water flow gently through the lower jet pipes only, the lower extremities only may be bathed. This advantage adapts it to persons who dislike the wetting of the hair."

Claim.—"I do not claim as my invention the combination of lateral jets with a rising and falling cistern, but what I do claim is the combination

of the showering pan, a divided cistern, and horizontal arms, whereby the head may be showered with water of one temperature, and the lower parts of the body with water of another temperature, during the same operation. I also claim, in combination, the douche bath, the divided cistern, and tubes with horizontal jet arms, as herein set forth, to give a douche to the head and a shower to other parts of the body, of a different temperture. I also claim making the showering pan capable of being separated from the cistern, and of thereby making way, when required, for the use of the central douche tube. I also claim the adjustable sliding section tubes, having horizontal movable arms, with jets capable of being brought nearer to, or more remote from, each other, for the purpose of concentrating more or less the shower thrown on the lower parts of the body."

---

56. For an *Improved Roller Ox-shoe Machine with Movable Dies;* Philip P. Read, Bowdoin, Lincoln county, Maine, January 23.

Claim.—"I make no claim to the frame, roller, axles, and gearing, as these are made and arranged like the ordinary rolling mill, nor do I claim segment dies fastened on rollers by screws; but what I do claim as my invention, is the employment of the segment and triangular dies, constructed, arranged, and operated as described, in combination with the cylinder made with beveled collars and nut for securing them."

---

57. For an *Improvement in Seed Planters;* Ebenezer J. Dickey, Hopewell Cotton Works, Chester county, Pennsylvania, January 23.

The patentee says,—"The nature of my invention consists in constructing a corn drill or seed planter in such a manner that but a single kernel will be deposited at a time in the drill."

Claim.—"What I claim as new, is the combination and arrangement of the grain box, the cup, the rotating perforated plate, the elastic brush, and the recesses in the lower edge of the rear side of the grain box, placed in such a manner that the operation of the said parts is brought immediately under the eye of the operator, for causing a single kernel to be deposited at a time in the drill as the machine is moved forward."

---

58. For an *Improvement in Seed Planters;* Jacob C. Miller, Marietta, Lancaster county, Pennsylvania, January 23.

The patentee says,—"The nature of my invention consists in the construction and arrangement of the revolving seed distributor and hopper for regulating the quantity of grain sowed, and in the employment of a guide wheel attached to the rear of the axle in the centre, by which the machine can be guided and turned."

Claim.—"What I claim as new, is, 1st, the construction and arrangement of the adjustable hopper and grooved roller, combined as set forth, and for the purposes designated. 2d, I claim the centre hind wheel, for guiding and regulating the apparatus."

59. For an *Improvement in Wool Cleaning and Lapping Machines;* Francis A. Calvert, Lowell, Middlesex county, Massachusetts, January 23.

The patentee says,—"The use and purpose of my improvements are to take the cotton or other fibrous material directly from the 'willowing' machine, (where it has been only partially cleaned,) and, by passing it through my apparatus, to pick, open, and more thoroughly clean and separate from the same all foreign substances, and at the same time, and in the same machine, form a more perfect lap for the carding machine, than has hitherto been produced by the common picking and lapping apparatus."

Claim.—"What I claim as my invention, is a toothed cylinder for forming a lap of cotton, wool, or other fibrous material, to be used in lieu of the wire-netted cylinder. I also claim the combination of the burring apparatus, or an apparatus for opening, picking, and cleaning cotton and wool, with the calender and lap rollers."

---

60. For a *Combined Double Hinge and Spring;* Andrew B. Taft, City of New York, January 23.

The patentee says,—"This invention consists principally in the construction and application of a double-jointed hinge, which admits of the opening of the door or gate, or other thing, (requiring to open both ways,) in either direction, and in the combination of this peculiar hinge with two springs connected by a chain, whereby the door, gate, &c., is held close to the casing, and also closes itself."

Claim.—"What I claim as my invention, is double-jointed hinges constructed as described, in combination with a chain or cord and two springs, arranged as herein set forth."

---

61. For an *Improved Self-Inflating and Folding Life-Boat;* Wm. and Thos. Schnebly, City of New York, January 23.

Claim.—"What we claim, is forming the sides of life-boats of two or more thicknesses of flexible material impervious to both air and water, so arranged, and in combination with gunwales or intermediate gunwales and the bottom, as to form air chambers on both sides of the boat from stem to stern, which may be inflated with air, more or less, by raising up the gunwales or intermediate gunwales from the bottom of the boat, on which they rest when the boat is folded up."

---

62. For an *Improved Process of Welding Cast to Wrought Iron or Steel;* M. Fisher and Wm. Martin, Jr., Newport, Penobscot county, Maine, January 23.

The patentees say,—"The nature of our invention consists in properly heating the steel or wrought iron before the cast iron is poured upon it, as described in a patent granted to us, dated the 16th October, 1847, upon which this is an improvement."

Claim.—"We do not claim heating wrought iron in a furnace, and then placing it in a mould and casting iron around it, so as to enclose it therein, that having been done before; but what we claim as new, is heating the

steel or wrought iron to which the cast iron is to be affixed, before casting the melted iron upon it, by means of a portion of melted iron poured against that side of the steel which is not to be attached to the finished article. We also claim re-pouring the metal upon the steel, by which much saving in the cost of melting more iron than is required for the casting is saved."

---

63. For an *Improvement in Machines for Making Envelopes;* William W. Rose, assignee of J. K. Park and Cornelius S. Watson, City of New York, January 23.

The patentee says,—"The nature of my invention consists in the combining and arranging in a table or frame certain levers or treadles, having upright sliding bars connected thereto, for stamping or creasing the paper for envelopes, and gumming the edges of the same, with a folder frame and folders attached in such manner as, when the treadles are operated upon by the attendant of the machine, the paper is gummed and folded into envelopes at one operation."

Claim.—"What I claim as my invention, is the invention herein described for making envelopes, the same consisting of the stamper rod, the gumming apparatus, and the folding apparatus."

---

64. For an *Improvement in Taking Daguerreotype Pictures;* John A. Whipple, Boston, Massachusetts, January 23.

The patentee says,—"My improvement enables me to produce a Daguerreotype miniature of the face of a person resting upon a back-ground, which does not exhibit, to any material extent, the objects in the rear or vicinity of said face, the said back-ground being made to have a cloudy appearance, or one very much like that which is usually given to portraits of faces taken in crayon."

Claim.—"What I claim as my improvement, in combination with the Daguerreotype process, is the above specified mode of arranging and operating an opaque, or partially opaque, screen, having an aperture or its equivalent, the same being placed between the sitter or object and the camera, and put in motion or maintained in position substantially as above specified."

---

65. For an *Improvement in Guards or Strippers for Burring Machines;* Alex. Wright, Lowell, Middlesex county, Massachusetts, January 23.

The patentee says,—"By my improved mode of constructing the cylinders, they are believed to be much preferable to others in their operation, while at the same time their first cost is quite inconsiderable in comparison with others, and they are readily susceptible of repair, being then as good as new ones."

Claim.—"What I claim as my invention, is a guard or stripper cylinder, (used in machines for burring wool and cleaning cotton,) constructed with steel strips, for scrapers, arranged and combined with the wooden segments about a roller or shaft."

66. For an *Improvement in Carving Machines;* Hezekiah Augur, New Haven, Connecticut, January 23.

The patentee says,—"My improved machine is, in many respects, very much like the machine described in the specification of letters patent granted to me on the 23d day of December, A. D. 1846, the principal or distinguishing difference being, that my present improved machine is capable of carving or producing copies larger or smaller than the original bas-relief, and in any desired proportion or proportions within its limits, whereas my former machine, or that heretofore patented, would only produce a copy of the same size of the original ornament."

Claim.—"What I claim as my invention, is the peculiar system of jointed parallel bars, moving frame, or two rack bars in combination with each other, and either of the two moving carriages, and made to operate in manner so as to impart to one of said carriages a greater degree of velocity of motion than the other, under the circumstances, and for the purpose of moving the tablets or chucks, and making a copy of enlarged dimensions. And I also claim the combination of the two sets of carriages, and their two sets or systems of parallel bars, and moving frame and rack bars, as applied together and combined with the tablets, for the purpose of imparting to the tablets lateral and transverse movements at different velocities. And I also claim the frame of each tablet, and the mechanism for giving to it a transverse dip or inclination, in combination with its carriage, and the rocker shaft and mechanism for inclining and turning the tablet in lateral and other directions."

---

67. For an *Improved Combined Hinge-Fastener and Shutter-Opener;* A. S. Pelton, Clinton, Middlesex county, Connecticut, January 23.

Claim.—"What I claim as my invention, is, 1st, the peculiar manner in which I construct the hinge and propelling rod combined therewith, by which I unfasten, turn back, and secure window blinds, by simply moving the rod outward; and again unhook, turn, and re-fasten the said window blinds, by reversing the movement of the rod, without raising the sash in either operation: that is to say, I claim constructing the rod, with spaces in the side and inclined planes in the top thereof, at the end of the rack, in combination with the inclined planes on the upper half of the hinge.

"2d, I also claim the before described mode of locking the upper and lower parts of the hinge, by means of a hook on the end of the rod entering a corresponding groove in the upper part of the hinge; the rod being prevented from rising by being passed through the mortise in the box of the lower half of the hinge, by which mode of fastening the blind is effectually secured from being raised or opened from outside the building."

---

68. For an *Improvement in Registers for Hot Air Furnaces;* Charles F. Tuttle, Williamsburg, Kings county, New York, January 23.

The patentee says,—"The nature of my invention consists in the new and improved method adopted in opening or closing the register or ventilator, by means of an upright or vertical wheel, which is connected with, and gives motion to, the valves, by means of a movable connecting rod

which is suspended on the side of the wheel or pin projecting therefrom, and this connecting rod is attached to the valves by pins at their ends."

Claim.—"What I claim as new, is the application of the upright or vertical wheel to the opening and closing of registers and ventilators, the edge or top of which is placed flush, or nearly so, with the top surface of the register, and can be acted upon with the foot if desired. This wheel is so placed and connected to the valves by means of a movable connecting rod, which rod is suspended upon a pin projecting from the side of the wheel, and connected or attached to the valves by pins projecting from the ends of the valves at a distance from their centre."

---

69. For an *Improvement in Cooking Stoves;* Evan L. Evans, Mount Holly, Burlington county, New Jersey, January 30.

The patentee says,—"The nature of my invention and improvement consists in a peculiar arrangement of the flues, air chambers, dampers, and doors, whereby the oven may be heated or cooled, the draft of the fire increased or diminished, and the heat radiated and diffused, by means of currents of air, throughout the apartment in which the stove is placed, to a greater or less extent, and with greater ease and certainty than the same has heretofore been done."

Claim.—"What I claim as my invention, is the arrangment of the damper, the flues, and the doors, for the purpose of cooling the oven and heating the apartment in which the stove is placed, by promoting the radiation of heat and the circulation of hot air. I also claim the arrangement of the damper, by which the hot air in the flue may be directed into or around the oven."

---

70. For an *Improvement in the Reduction of Ores;* Alexander Parkes, Birmingham, England, January 30; (dated in England, Nov. 18, 1847.)

The patentee says,—"My invention relates to the manufacture of metals by the employment of fluxes."

Claim.—"What I claim as my invention, is the above described flux composition, to be used in the manufacture of metals as above specified, the same consisting of muriatic acid, or any chemical equivalent therefor, water, charcoal, coal, or anthracite, or any carbonaceous equivalent therefor, and caustic lime, magnesian limestone, baryta, or any alkaline or earthy chemical equivalent, the same being combined and used in the proportions above represented or in any others which will produce like results."

---

71. For an *Improvement in Baking Apparatus;* John P. Hayes, Boston, Massachusetts, January 30.

The patentee says,—"My design in devising my aforesaid new cooking apparatus, was to secure an arrangement of several parallel cooking or baking apartments, one above the other, and so combined with the fire chamber as to provide for cooking meat, bread, or other articles requiring a large amount of heat to penetrate through them, in the apartment immediately over the fire chamber, while in the upper apartments cake and

pastry may be thoroughly baked by carrying the smoke, &c., entirely around them."

Claim.—"What I claim as my invention, is a cooking or baking apparatus, having several parallel baking chambers, with divided horizontal flue spaces between them, communicating with vertical flue spaces on each side of them, and so as to make the smoke, &c., pass around said chambers. I also claim connecting said chambers with each other, by the combination of the turning registers in their backs with the vertical hollow shaft."

---

72. For an *Improvement in Railroad Trucks;* Jacob G. Day, Brooklyn, Kings county, New York, January 30.

The patentee says,—"The nature of my invention consists in a novel and useful method of constructing wheels and trucks for railways, the said improvements having for their object increased safety in running, and economy of manufacture."

Claim.—"What I claim as my invention and improvement, is giving to the axis of the wheels such an angle as will join their circumferences in the manner described. 2d, I claim giving to the flanches any angle which shall be less than a right angle to the bearing faces of the wheel, so that when the wheels are upon the rails, in their proper position in the trucks, the said flanches shall project under the concave sides of the rails. 3d, I claim the shapes and combinations of the truck frame pieces, so as to form upper and lower bearings for the wheels."

---

73. For an *Improvement in Dumping Cars;* Alpheus Nettleton, Springfield, Hampden county, Massachusetts, January 30.

The patentee says,—"My improvement in the manner of constructing a dumping car, not only admits of the body of the car being arranged at the same height above the track as those of the merchandise cars, but presents all the advantages of dumping or discharging earth, coal, or other matters, which are to be found in the common dumping car."

Claim.—"I do not claim the mode of supporting a car body by means of semi-circular arcs or rockers affixed thereto, and made to rest and rock on the top of the truck frame, as the same has heretofore been effected; but that which I do claim is my improvement or mechanism for sustaining and operating the car body, the same consisting in the rollers or small wheels, and their rail or bearing plates, as constructed and combined together, and with the body and truck frame, and made to operate the car body substantially as above specified; my said invention enabling me not only to construct a dumping car much lower than others in general use, but so low as to be used in trains with common merchandise cars."

---

74. For an *Improvement in the Manufacture of India Rubber;* H. G. Tyer and John Helm, New Brunswick, Middlesex county, New Jersey, January 30.

The patentees say,—"The nature of our invention consists in forming

a compound of caoutchouc, carbonate of zinc, or other preparations of that metal, and sulphur, which is perfectly elastic, impermeable to air or water, unchangeable in extreme temperatures, preserving its color without 'bloom,' and free from the deadly action upon the constitution and health hitherto experienced by the operatives employed in the preparation of metallic vulcanized rubber."

Claim.—"What we claim, is the combination of caoutchouc, in its several varieties, with either carbonate of zinc, sulphate of zinc, or the other salts of zinc, with sulphur, in manner, form, and proportion, as hereinbefore set forth."

---

75. For an *Improvement in Cooking Stoves;* Joseph Feinour, Philadelphia, Pennsylvania, January 30.

Claim.—"What I claim as my invention, is the combination of the perforated registers with the principal and auxiliary ovens, for the purpose of either establishing a communication between them, or separating them, as herein set forth. I likewise claim the combination of the perforated sliding plate with the plate *g'*, to open and close a communication between the ovens and the flue, the plate *g'*, also, by being removed, furnishing a ready means of access to the flue, for the purpose of cleaning it."

---

76. For an *Improvement in Cooking Stoves;* R. D. Granger, Albany, New York, January 30.

The patentee says,—"The nature of my invention consists in the manner of introducing highly heated air into the oven of a reverberating or dividing flue cooking stove, the air itself being made to pass around three sides of the oven before entering it."

Claim.—"What I claim as new, is the employment of air passages for the purpose of equalizing and economising the heat in the oven. I also claim the construction for the introduction of heated air into the oven, and withdrawing the same, and passing it under the grate of the fire chamber to support combustion. I also claim the divisions between the fire chamber and oven, to form the air passages illustrated in the body of the description."

---

77. For an *Improvement in Cooking Stoves;* R. D. Granger, Albany, New York, January 30.

The patentee says,—"The improvements, which are novel, consist in the bottom grate of the fire chamber, composed of a series of tubes, the under sides of which are flat, with a space between each, as clearly shown in the drawing; below this grate there is a sliding lattice damper of common construction, which fits up against the bottom of the tubes, and can be made to close the spaces between them, or partially so, as desired."

Claim.—"What I claim as new, is the combination of the tubular grate, or air-heating tubes, with damper below the same, in the manner described. I also claim the combination of the air-heating grate tubes at the bottom and back of the fire chamber, together with the oblong chamber under the smoke flue, for the purpose of conveying air into each end of the oven, by

which a great amount of radiating surface for heating air is obtained with the oven, for the purpose of baking by means of heated air."

---

78. For an *Improvement in Cooking Stoves;* John L. Gerow, Marlborough, Ulster county, New York, January 30.

The patentee says,—"My improvement consists in forming two diving flues at the ends of the fire chamber, which communicate with the broad flue beneath the oven, (extending the whole breadth of the stove,) and also communicating with the top and back flues. Another improvement consists in making a number of rectangular openings in the vertical transverse plate, arranged between the fire chamber and the oven, through which the draft is made to pass from the aforesaid end diving flues to the broad flue beneath the oven; and also down through the grate and through the middle openings of said plate, by moving the lower register plate to the right or left."

Claim.—"What I claim as my invention, is, 1st, the combination and arrangement of the two end flues with the broad flue beneath the oven, and the flues at the back and top thereof.

"2d, I claim the combination and arrangement of the flues beneath the grate with the broad flue beneath the oven, by which the draft may be made to pass down through the grate and under the same, in order to kindle from the top, by closing the upper register plates and the side flues, and opening the central flues."

---

79. For an *Improved Lubricating Compound;* Alonzo S. Grenville, Westborough, Worcester county, Massachusetts, January 30.

The patentee says,—"The object I have in view in using the straits or cod-liver oil, in connexion with either the sperm or lard oil, or both, and magnesia, is that it causes the magnesia to be held in suspension in the mixture of oils."

Claim.—"I claim as my invention, the combination of the straits oil with the magnesia and the sperm oil, lard oil, or a mixture of the two, or any oleaginous matter or matters possessing like powers of non-suspension, the same enabling me to make a very cheap and efficient anti-friction oil, to be applied to the lubrication of machinery."

---

80. For an *Improvement in the Manufacture of Vinegar;* James Ruggles, Philadelphia, Pennsylvania, January 30.

The patentee says,—"The principle of my invention is a discovery which I have made, viz., that the swill or slops of whiskey distilleries, and of other manufactories employing similar materials, contain a large amount of the elements of vinegar. Such slops or swills likewise contain a considerable quantity of other ingredients not capable of forming vinegar, from which it is necessary to free them before completing the chemical process of transforming them into vinegar. Without such purification, the proper rapidity of action could not be attained, and a process of putrefaction would ensue both offensive and deleterious. The nature of my invention consists in the application of means for economising a substance now generally thrown away as useless."

Claim.—"What I claim as my invention, is the making of good wholesome vinegar from the slops or swill, commonly so called, being the waste or spent liquors of distilleries and other manufactories.

"I also claim the making of vinegar from the combinations of slops or swills, waste or spent liquors of distilleries, breweries, starch manufactories, and other workshops in which vegetable substances have undergone fermentation and partial decomposition, with vinous, or alcoholic, or any lacteous, saccharine, or other vegetable materials added thereto, when employed to increase the strength of vinegar, manufactured from said slops or swills, waste or spent liquors.

"I also claim the combination of apparatus for effecting the several successive processes of converting the slops or swills of distilleries and other manufactories, and the mixtures of the same, with other materials added thereto, to increase the strength of the vinegar.

---

81. For a *Combined Spring Rock Drilling Machine;* Samuel Jack, Jr., Richmond, Lincoln county, Maine, January 30.

Claim,—"What I claim as my invention, is the improvement or combination of springs for supporting and operating the drill, the said combination consisting of the two long springs, and the two elliptical springs of each long spring, one of the same being placed above its end, and the other below the said long spring, the said long springs being connected together, and made to operate and simultaneously raise and lower the drill. I lay no claim to supporting a drill on or by a spring, or on or by a long bar or lever elevated by a cam or other proper contrivance, as I am aware, or think, that in all this there is no novelty; but I rest my claim on the combination of springs for working the drill, as, by my combination, I not only preserve the drill in a vertical line during its movements, but I avoid the disastrous effects which have been usually produced on the machinery by the percussion or the blow of the drill."

---

82. For an *Improved Machine for Making Suspender Buckles;* Charles A. Lent, Newark, Essex county, New Jersey, January 30.

Claim.—"What I claim as my invention, is the combination of the cross head with the die for forming the buckle, when such cross head is jointed and acted upon by guides, by means of which I am enabled to bend the wire to an angle a little less than a right angle."

---

83. For an *Improvement in Flood Fences;* John Sourbeer, Mount Joy township, Adams county, Pennsylvania, January 30.

The patentee says,—"The nature of my invention consists in constructing such a fence, that, when the water rises to the first rail, it will raise it out of the mortise in the post at one end, and hold fast by the hook and staple to the post at the other end, and swing round in any course the current may take it, and as the water rises the rails will be raised out one by one, until the water course will have no other obstacle than the posts, and when the water falls, the rails are soon put to their place again."

Claim.—"What I claim as my invention, is the manner of fastening the rails to the posts, that, in opening, they have the full scope of a semi-circle for the current of water to carry them, and on that account will answer for the safety of fences alongside of a water course, as well as those crossing the water course in any direction whatever; and also the shape of the mortise in the post, which I cannot describe better in writing than has been done."

---

84. For an *Improved Multiple Grate Furnace for Locomotive Boilers;* Frederick Harbach, Cleveland, Ohio, January 30.

The patentee says,—"The nature of my improvement consists in an arrangement or combination, with the main tubular flue and water section of the boiler of a locomotive engine, of a series of two or more fire boxes, (each including a fire place, grate, and ash pit,) and one or more water chambers or spaces between, or connected with, each two of said fire boxes, the whole being so disposed and made to operate, as not only to greatly increase what is usually termed the grate surface, but the water surface also exposed to the action of the flame or heat proceeding from the fuel in combustion. Each of the said fire boxes is to have all the usual appendages for burning coal (whether anthacite or bituminous) separate from the other; oxygen, or atmospheric air containing the same, in addition to the ordinary draft created by the exhaust steam, being supplied by a blower driven by the main engine or a separate one, as circumstances may require."

Claim.—"What I claim as my invention, is the combination and arrangement of two or more fire boxes, and the water chamber or chambers between them, with each other, and the main boiler and flues, when said fire boxes are arranged vertically over each other; the whole being arranged, constructed, connected, and made to operate, as above specified, and for the purpose of using anthracite coal, and increasing the fire and water surface in boilers whose position is such that it is difficult to extend the fire surface horizontally, and thereby improving the capacity of the boiler to generate steam."

---

85. For an *Improved Hinge Claw-Wrench;* Adam Hay, Newark, New Jersey, January 30.

The patentee says,—"The nature of this invention consists in securing to the end of a suitable handle a metallic casting, having a cog formed on one of its sides, and attaching to said casting, by means of a pin, a curved metallic claw, so formed on its inner surface, and moving in such relation to the cog on the side of the casting, as to enable a person to confine different sized nuts or screw bolts between its inner surface and the cog, with sufficient security to turn the same by the application of force to the handle, thus forming a cheap, simple, and efficient wrench, adapted to different sized nuts and bolts, and but little liable to get out of order."

Claim.—"What I claim, is constructing a wrench with a protuberance or cog on its side, and a hinged claw at its end, of the form described and

represented in the drawings, in such a manner as to enable a person to grasp and turn screw bolts and nuts of different sizes with the same."

---

86. For an *Improved Roller Weather Strip;* Hiram C. Brown, Xenia, Greene county, Ohio, January 30.

The patentee says,—"The nature of my invention consists in providing, of any known materials, a roller for the bottom of doors and windows, enclosed in a groove and supported as described."

Claim.—"What I claim as my invention, is the combination of a roller in a groove with the bottom of a door or window, and threshold with a rebate in it, the said roller having play in its bearings, and the whole constructed and acting as described."

---

87. For a *Mill for Rolling Irregular Shapes by means of a Cam Pattern;* John S. Hall, Columbus, Franklin county, Ohio, January 30.

The patentee says,—"The nature of my invention consists in connecting with the rollers of an ordinary rolling mill a cam shaft, with cams thereon, to act upon the boxes in which the upper roller turns, so as to cause it to rise and fall, to draw bars to any pattern; by changing the relative size of the gearing, I am enabled to make on a small cam a sufficient pattern for rolling a long bar, thus making a compact and a variable machine by simply changing, or, when the peculiar character of the pattern requires it, making the cam move faster, so as to reduce the pattern."

Claim,—"What I claim as my invention, is the employment of cams for elevating and depressing the top roller of a rolling mill, in combination with gearing, the same as set forth, so that a pattern of any length on the cam may be made to affect the surface of any given length of bar, in proportional ratio, by change of the relative size of the gearing, by which I avoid, in rolling long bars, any long patterns, difficult to handle and expensive to construct."

---

88. For an *Improvement in Cooking Stoves;* William Stephenson, Cincinnati, Ohio, January 30.

The patentee says,—"My invention and improvement consists in constructing the stove with vertical ascending and descending side flues in the sides of the stove, in which the oven doors are usually placed, and between the doors and corners of the stove, through which the smoke and heat are caused to pass to a horizontal flue between the oven and fire chamber, and through a flue beneath the oven. Also in the arrangement of a sliding register plate in the back flue of the stove, which, when open, will cause the draft to be from the fire chamber down the back corner flues, and up through said register plate directly to the smoke pipe. Likewise in the arrangement of a movable fire back in the fire chamber, for the purpose of increasing or diminishing the capacity of the fire chamber at pleasure, by moving said back toward or from the front of the stove."

Claim.—"What I claim as my invention, is, 1st, the arrangement of the vertical descending and ascending flues, constructed in the side plates of

the oven, between the oven doors and the corners of the stove, in combination with the flues leading from the middle flue to the smoke pipe; and, in combination with these, I claim the arrangement of the sliding register."

---

DESIGN.

1. For a *Design for Stoves;* N. P. Peck, Spingfield, Hampden county, Massachusetts, January 23.

Claim.—"What I claim as my invention or production, is the combination of ornamental mouldings and carvings, or configurations, herein above described and represented in the drawings, for the side and back plates of a cooking stove."

---

*List of American Patents which issued in the month of February*, 1849, *with Exemplifications by* CHARLES M. KELLER, *late Chief Examiner of Patents, in the U. S. Patent Office.*

1. For an *Improvement in Cooking Stoves;* James White, Milton, Northumberland county, Pennsylvania, February 6.

Claim.—"What I claim as my invention, is, 1st, making the cook stove with a cylindrical chamber of combustion, having a vibrating grate at the bottom thereof, arranged above the oven at the back of the ordinary chamber of combustion, in combination with a rectangular fire chamber for the burning of wood, and four descending flues, two of which merge into a large flue in front, made the full breadth of the stove, and decreasing in width until it intersects a horizontal flue beneath the larger oven, made the length and breadth of the stove, leading into the usual central flue at the back, said coal and wood fires being used together or separately as preferred; the front descending flue being made to lessen in width as it descends towards the bottom flue, for the purpose of spreading the draft more equally beneath the oven.

"2d, I also claim extending the oven upward behind the cylindrical coal chamber, and the space occupied by the fire chambers, for the purpose of obtaining the radial heat of the convex surface of the cylinder in the upper portion of the oven."

---

2. For an *Improvement in Tops for Wire Ropes;* John A. Roebling, Saxonburg, Butler county, Pennsylvania, February 6.

Claim.—"What I claim as new and as my original invention, is the construction of a conical 'top,' with two or more circles of notches, which vary in depth and extent, so as to suit the passage of the different circles of wires which are to compose a compound strand, thereby uniting the advantages of a perforated plate with the easy curves of a common top. I also claim the application of one or more rings or bands, for the purpose of keeping the different circles of wires apart, as well as to keep the wires separate amongst themselves."

3. For an *Improvement in Cooking Stoves;* Geo. B. Whiteside, Brockport, Monroe county, New York, February 6.

The patentee says,—"The following are the purposes of my invention: 1. To moderate the heat and prevent the destruction of the back fire plate of my stove, without allowing the over-heated air and disagreeable effluvia thence arising, either to pass into the apartment containing the stove, or to be thrown into the oven, where its effects would be injurious rather than beneficial to the food baked therein. 2. To ventilate the oven, by allowing a ready escape of the vapors and gases from the baking through openings in the highest part of the oven, without, however, admitting dust or soot from the combustion to fall upon the food. 3. To ventilate the boilers placed over the fire, and avoid the disagreeable odors thence arising, without involving the necessity of using long and inconvenient conducting tubes to convey away the fumes. 4. To bring into a compact and sightly form the apparatus for effecting all the above purposes, and maintaining symmetry of appearance, while freeing the apartment from the disagreeable odors generally prevalent where culinary operations are carried on."

Claim.—"What I claim as my invention, is the horizontal ventilating passage between the top plate of the stove and the top plate of the oven, separate from the flue which carries the burnt gases, arranged in the manner, and acting to effect the several purposes of ventilation, substantially as herein set forth.

"2d, I also claim the air passage leading from the top of the air chamber back of the fire plate, in combination with a ventilator passage independent of a smoke flue, constructed and acting to carry away the overheated air from said air chamber, in the manner set forth.

"3d, I also claim, in combination with a horizontal ventilating flue, separate from the smoke flues and crossing the top of the oven, the ventilating passages in the top plate of the oven, having a regulating slide which adjusts the opening into the ventilating flue, as herein described.

"4th, I also claim, in combination with a horizontal ventilating passage, separate from the smoke flues, and between the top plate of the stove and the top plate of the oven, the front opening, whereby the front tier of boilers is ventilated without interfering with the position or with the convenient use of the other boilers, and without mixing their steam with the gases from the fire, and cooling them while passing round the oven, in the manner set forth; but I do not claim the general principle of conducting away steam by pipes leading into smoke flues or chimneys."

---

4. For an *Improvement in Machinery for Spinning Hemp;* Wm. Pedrick and Thos. M. Melvin, Charlestown, Middlesex county, Massachusetts, February 6.

The patentees say,—"The peculiar object of our improvement is to produce a constantly increasing draft on the bobbin, sufficient to enable it to take up the yarn as fast as spun, and as the diameter of the cylinder of yarn wound on the bobbin increases in size."

Claim.—"What we claim, therefore, as our invention, is the combination of levers, or any mechanical equivalent or equivalents, a screw and weight, or any mechanical equivalent or equivalents therefor, and the pulley and

friction plate, the whole being applied and operated together, and so as to actuate the bobbin, substantially in the manner and for the purpose as specified."

---

5. For an *Improvement in Hoisting Apparatus;* Elijah Learned, Boston, Massachusetts, February 6.

Claim.—"What I claim as my invention, is the friction disk, the driving wheel, and the system of levers or leverage applied thereto, as combined together and with the hollow windlass barrel, and made to operate substantially as specified; and I also claim the combination of the same and the spring weighing apparatus, which serves not only to present to the action of the friction apparatus, under certain circumstances, the relief of a spring, but also to determine the approximate weight of a body raised by the machinery."

---

6. For an *Improvement in Cooking Stoves;* Elisha Vance, Wilmington, Clinton county, Ohio, February 6.

Claim.—"What I claim as new, is the combination of the diving flue with the flues F, arranged as described, for the purpose of evenly distributing and equalizing the heat on the four sides of the oven, without using or requiring dampers."

---

7. For an *Improvement in Plates for Boiler Holes and Tops of Stoves;* John B. Chollar, Albany, New York, February 6.

The patentee says,—"The nature of my invention consists in forming a protective shell or case in the form of a tray or trough of cast iron, and so adapting it to the under side (next the fire) of the centre cross piece as to protect it from the heat of the fuel needed to be used for culinary or other purposes, thereby avoiding the loss of the centre or cross piece by its settling when heated."

Claim.—"What I claim as my invention, is the application of a hollow shell of cast iron as a protective plate, in connection with the holes A A, to centre or cross pieces for cooking stoves and ranges."

---

8. For an *Improved Method for Boring Gun Barrels;* Henry Peeler, Boston, Massachusetts, February 6.

The patentee says,—"My process of boring consists in using a twisted drill, as usual, but in connexion with others."

Claim.—"What I claim as my invention, is the above described mode or process of boring gun barrels, or articles of like character, the same consisting in using the three drills, X Y Z, in the order and manner specified."

---

9. For an *Improvement in Cooking Stoves;* William Cobb, Albany, New York, February 6.

Claim.—"I claim the special combination and arrangement of hot air,

fire, and heated gas channels and flues, in connexion with the heating and culinary apparatus of a cooking range or stove, as described."

---

10. For a *Bolt and Disk Sectional Cannon;* Jesse Fitzgerald, City of New York, February 6.

Claim.—"What I claim as my invention, is the combination of metallic plates and bolts in the manner above described, to construct a cannon."

---

11. For an *Improvement in Rotary Cutter Ploughs;* Thomas J. Tuthill, Elmira, Chemung county, New York, February 6.

Claim.—"What I claim as my invention, are the rotary cutters and screw shaft, in combination with the wheel and handle shafts, arranged in the manner and for the purpose described."

---

12. For an *Adjustable Lever Cut-Off with Secondary Toe No.* 1; Horatio Allen, City of New York, February 6.

Claim.—"What I claim in this invention and combination, is, 1st, the use of a secondary toe having a fixed centre, which toe is moved by a motion taken from the usual rock shaft, and is lowered by a motion coincident with that of the piston, and by means of which the valve can be raised and returned to its seat at any portion of the stroke without concussion.

"2d, The use of a double fulcrum lever, the ends of which are alternately sources of motion and fulcra, and by means of which, in combination with motions which are nearly at right angles to each other, the valve will be raised at the commencement of the stroke, and then restored to its seat at such part of the stroke as the adjustment provides for.

"3d, The use of the adjustable piece, by means of which the proportion of cut-off is changed.

"4th, The mode of working the steam valve, by the combination of the secondary toe, lever, adjustable piece, and arm, substantially as set forth."

---

13. For an *Adjustable Lever Cut-Off with Secondary Toe No.* 2; Horatio Allen, City of New York, February 6.

Claim.—"What I claim, is the combination of the lever, adjustable piece, and toe, with the lifting rod, by means of which the valve is raised at the commencement of the stroke, and the combination of the lever, link, and arm, with the cut-off rock shaft, by means of which the valve is lowered to its seat."

---

14. For an *Improvement in Music Stands;* Henry W. Holly, Stamford, Fairfield county, Connecticut, February 6.

The patentee says,—"The nature of my invention consists in making a stand for holding books for music, &c., and having facilities for turning the leaves of music or books over at pleasure, without the use of the hands."

Claim.—"What I claim as my invention, is the combination and arrangement of an apparatus with the music or book stand, which apparatus

consists of the connecting bar, crank, and the second crank to slide the catch bar."

---

15. For an *Improvement in Cutting Boot Heels;* Philander Shaw, Abington, Plymouth county, Massachusetts, February 6.

Claim.—"What I claim as my invention, is a combination composed of the following elements, viz., the inclined plane or bed, the curved cutters, and machinery for depressing them, and expanding or separating them during their descent, the whole being constructed and made to operate as specified; not meaning to confine each or any member of the said combination to the exact form, shape, or construction, as described and exhibited, while it may be possible to vary the same without any substantial change of the whole combination, but to employ any machinery which may be considered a mechanical equivalent for such member. And, in combination with the bed and cutters, I claim the bent lever, or any mechanical equivalent, the same being for the purpose as hereinbefore explained."

---

16. For a *Piston Valve Inclosed in the Steam Cylinder;* Isaac L. Bennett, Westerloo, Albany county, New York, February 6.

Claim,—"What I claim as my invention, is the employment of the two sliding ring valves, in combination with the cylinder and reciprocating piston, for admitting the steam to, and discharging it from, the cylinder in reciprocal succession, by the alternate direct action of the piston on the ring valves, and without the intervention of any other agents, whether the valves be connected in the manner described, or in any other way which is substantially the same, and by which analogous results are produced."

---

17. For an *Improved Lever Scale for Canals, Railroads, &c.;* Eli Ellicott and Samuel A. Abbot, Philadelphia, Pennsylvania, February 6.

The patentees say,—"The nature of our invention consists in placing upon each side of the top or base of the lock, dock, canal, or other desired place, two chairs or supports at proper distances apart, to keep in position the suspended levers, (which are simple levers having fulcrums,) and running parallel to said lock, dock, railroad, &c., which levers give the first action to the scale, and, by the multiplication of said chairs and levers, the scale may be extended to any required length."

Claim.—"What we claim as our invention, is the combination with each other of two or more simple horizontal chairs, placed on each side of the top or base of a lock, canal, dock, railroad, or other desired place, and running parallel thereto, by which means the scale may be extended to any length, from the smallest to the greatest, with entire accuracy, and by the multiplication of said levers, can be obtained a scale strong enough for any purpose; the whole operating substantially as described."

---

18. For an *Improvement in Dumping Wagons;* William H. Start, Smyrna, Kent county, Delaware, February 6.

The patentee says,—"The nature of my invention consists in so arrang-

ing the body of a wagon that it may be run back on friction wheels, until its centre of gravity is brought over the axletree of the hind wheels, when it is tipped or tilted up, to dump or discharge its load, springs being arranged to prevent any sudden concussion or jar when the box is turned and slips down."

Claim.—"What I claim as my invention, is the arrangement of the cavities, in combination with the friction rollers, whereby the box is moved backward and forward (preparatory to and after tilting its load) easily and but with little friction, and when in place rests upon, and in contact with, the sides of the frame throughout its entire length, which greatly increases the strength and durability of the wagon."

---

19. For an *Improvement in Sewing Machines;* Charles Morey and J. B. Johnson, Boston, Massachusetts, February 6.

The patentees say,—"The kind of sewing which is effected by our machine is what is generally called 'chain-stitch;' that is to say, the thread is passed through the cloth in the form of loops, each one of which is passed through the one next to it and in rear of it. The formation of the loops or stitches, and their interlacement, are produced in a very simple manner by the united operations of a needle and a hook."

Claim.—"In the above machine we claim as our invention the combination of a needle and a hook, as constructed and made to operate together substantially in the manner and for the purpose of sewing cloth, (or any other material or materials capable of being sewed,) as specified."

---

20. For an *Improvement in Ploughs;* Joseph C. Cloud, May's Landing, Atlantic county, New Jersey, February 6.

Claim.—"What I claim as new, is, 1st, the employment of what I have denominated the auxiliary furrow side, forming a broad bearing at the heel of the mould-board, which is to be formed and combined with the plough, either in one piece with the mould-board, or by an additional casting. I also claim the fastening of the cutter, extending down on the landside to the bottom of the plough, by means of a mortise through it that receives the tenon on the wrought iron plate, and which plate is bolted to the mould-board. I claim the particular manner in which I secure the point and share to the cutter, by means of the plate having a tenon thereon and the ordinary screw bolt, as described."

---

21. For an *Improvement in Cheese Presses;* Lansing Kellogg, Ravenna, Portage county, Ohio, February 6.

The patentee says,—"The nature of my invention consists in placing between a pair of toggle joint levers, and a screw which operates therein, an elliptical or other spring, in such a manner that it is compressed by the force applied by the screw to the levers, and, by its effort to expand again, has the effect of continuing the pressure of the levers upon the cheese, or whatever substance is placed between them, and the platen, after the screw has ceased to operate."

Claim.—"What I claim as my invention, is the combination of the

spring with the screw and toggle joint, as herein set forth, or in any other substantially similar manner by which the same effects are produced."

---

22. For an *Improvement in Coloring Bricks;* Cyrus B. Doty, Cortlandt, Westchester county, New York, February 6.

The patentee says,—"The nature of my invention consists in providing certain suitable facings upon the outside of bricks, by which I obtain a uniform color or an ornamented surface, either at pleasure."

Claim.—"What I claim as my invention, is the peculiar process and manipulations of mixing coloring materials with the moulding sand for the surface of bricks, and the pressing the same upon and into the surface, so as to produce bricks of a uniform color upon the surface, as well as of a uniform shape and smoothness, the same being effected with greater economy than by mixing a sufficient quantity of coloring matter to color the whole body of the brick; and this regardless of any particular coloring matter or especial color to be produced when the bricks are burned."

---

23. For an *Improvement in Camphine Lamps;* Edwin B. Horn, Boston, Massachusetts, February 6.

The patentee says,—"The object of my improvement is to procure for the lamp two very important advantages, viz., that of a reduction of shadow peculiar to astral and other lamps, wherein the burner is made to extend through or into the fountain; also that of keeping or maintaining the camphine or volatile oil in the fountain at, or about at, its ordinary atmospheric temperature, in order that all or nearly all that portion of it which, in camphine lamps, wherein the fountain is made of glass, and the burner is made to extend into or through it, and in direct contact with and through the fluid in it, is, by heat, transmitted through the burner, usually evaporated through the top of the fountain and wasted, may be saved and burned with the remainder."

Claim.—"What I claim as of my invention, is the manner in which I construct the fountain, in order to allow the rays of light proceeding from the wick of the burner to pass downwards through both the internal and external concentric sides or shells of the fountain: that is to say, I claim an internal translucent side or shell, in combination with an external concentric translucent side or shell, whether the said two concentric translucent sides of the said fountain be connected together by a translucent or opaque bottom."

---

24. For an *Apparatus for Ascertaining the Saltness of Water in Steam Boilers;* William Sewall, Jr., Williamsburg, Kings county, New York, February 6.

The patentee says,—"The nature of my invention consists in constructing and arranging an apparatus containing a hydrometer, and with or without a thermometer, and so connected with a steam boiler as to readily pass a current of water from any part of the boiler through it, for the purpose of ascertaining at all times, by inspection, the exact degree of saltness of the water at such desired part of the boiler."

Claim.—"What I claim as new, is the employment of a cylinder containing an hydrometer, and with or without a thermometer, said cylinder being connected with a steam boiler, and constructed and arranged substantially as set forth, with a current of water passing from the boiler through it, which is kept always at the same height in the cylinder by means of a waste pipe, as described. And I further claim connecting said cylinder with the interior of the boiler by more than one pipe, at different levels, so that the saltness at any level can be determined."

---

25. For a *Method of Regulating the Supply of Water to Steam Boilers;* Warren S. Bartle, Newark, Wayne county, New York, February 6.

The patentee says,—"The nature of my invention consists in regulating the quantity of water forced into steam boilers, and thus maintaining it at a uniform height therein, by means of a float placed in the boiler, or in a chamber communicating with it, which float, by its rising and falling, directs the points of one or more clicks, moved longitudinally to and fro by the engine, alternately upon or away from adverse ratchets attached either to a cock in the pump, so as to turn the cock alternately one way and the other, and admit and shut off the water in its passage to the boiler, (the pump all the while moving,) or to a lever moving a clutch or other device, which stops and starts the wheel, pulley, or shaft, that drives the pump, and thus starts and stops the pump."

Claim.—"What I claim as my invention, is regulating feed in boilers by means of an arrangement of a float, a rocking shaft, kept in constant motion by the engine, vibrating clicks, and circular or straight ratchets, acting upon the cock stem, valve spindle, or pump shaft, so that the float is required to exert no direct force to regulate the supply, the whole machinery constructed and acting as described."

---

26. For an *Improvement in Wire Fences;* Henry Jenkins, Pottsville, Schuylkill county, Pennsylvania, February 13.

The patentee says,—"My invention consists in forming a fence of wrought iron in a cheap and economical manner, by the construction and arrangement of its several parts, by which a light and durable fence, of a highly ornamental character, can be made at as cheap a rate as one formed of cast iron, and in many cases cheaper."

Claim.—"I claim constructing the wrought iron wire fence, by forming the top and bottom rails and posts of the panel, of grooved bars, through which the ends of the wires, of which the meshes are made, are drawn, and the ends turned down into said grooves and then covered by other similar bars to hold them in place, by which a perfect finish is effected, and the expense and difficulty of riveting is avoided."

---

27. For an *Improvement in Apparatus for Heating by Vapor of Alcohol;* Thomas K. Anderson, Painted Post, Steuben county, New York, February 13.

The patentee says,—"The nature of my improvement consists in the

arrangement and construction of an apparatus that will, by its own heat, generate the substance for combustion sufficient to become a self-feeder, and with the parts arranged in a manner that fits it for heating rooms, generating steam, and other similar and useful purposes."

Claim.—"What I claim as new, is the combination of a reservior for holding the material to be burned, having a tube running through it in any convenient direction, with one or more small pipes or burners leading from the top thereof, and introduced in an angular direction near the bottom, as set forth, so as to cause the blaze therefrom to impinge on the side of the tube, the heat of the blaze causing a sufficient and constant supply of vapor to the burners without the aid of an auxiliary heater, and all the surplus heat being directed through the tube to the top thereof, for heating purposes. I also claim, in combination with said burner or burners, one or more jets leading into the current issuing through the tube for increasing the heat."

---

28. For an *Improvement in Self-Acting Presses;* Almeron McKinney and David Tyler, Clarksfield, Huron county, Ohio, February 13.

The patentees say,—"Our improvements consist in applying the power of compression through a cam and lever acting upon the piston upon which the platen rests, and supported by a stirrup, instead of applying it through a lever turning upon a fulcrum, and acting upon a pivot attached to the stem of the platen; also, in maintaining the platen in a horizontal position, by means of parallel rods turning on pivots."

Claim.—"What we claim as our invention, is the combination of the cam, lever, and head, with the platen, press beams, and parallel levers, whereby the platen is maintained in a horizontal position at every elevation, and the compression effected by the lever and cam, without passing pins through them as fulcra for them to turn on, thus avoiding the splitting of the levers and other arrangements, which are productive of so much inconvenience in presses heretofore constructed upon similar principles."

---

29. For an *Improvement in Door Locks, by which one keyhole serves for two distinct keys;* Amos Call, Springfield, Hampden county, Massachusetts, February 13.

The patentee says,—"My improvements consist in applying a detached slide to move the common latch bolt, the slide operated on by a key put through one end of a double-ended keyhole, the other end of which receives another key, to move and work a standing bolt, that permanently secures the door to which the lock is attached."

Claim.—"What I claim as new, is the application of such a keyhole to receive a different key at each end, such keys acting singly or successively to withdraw or project the night or standing bolt, or act upon the latch bolt by the intermediate slide, as these are all applied and conjoined for these purposes."

30. For an *Improvement in Composition for Filling Teeth;* Asa Hill and Samuel G. Blackman, Norwalk, Fairfield county, Connecticut, February 13.

The patentees say,—"This article is made by taking the gutta percha of commerce, freeing it from its impurities and coloring matter by boiling and working it, or by maceration, and combining with it, when sufficiently heated with a dry heat to render it plastic, about two parts quick lime, and two parts each of quartz and feldspar, all reduced to an impalpable powder."

Claim.—"What we claim is the combination of gutta percha as a base, with such other mineral, earthy, and metallic substances, as will make such a compound, of such a character, and adapted to such purposes, as we have described, viz., its combination with such of those substances as will shorten it and render it less tenacious, harden it and render it fit for a useful filling, and give it the desired color, without any noxious quality, and without destroying its plasticity when heated; and the application of the compound substance for that purpose."

---

31. For an *Improved Combination Revolving Tumbler Lock;* Linus Yale, Newport, Herkimer county, New York, February 13.

The patentee says,—"The invention now claimed by me consists of a series of improvements on a lock patented by me on the 13th day of June, 1844, in which the locking bolt is thrown out and in by a pin on the face of what I term a 'rotating tumbler,' which works in a groove in the face of the bolt, the said rotating tumbler being operated by a key, which, as it is inserted, forces out to the required distance a series of radial stops, that pass through holes in a cylindrical tumbler, and enter corresponding holes in a surrounding hollow cylinder. In the lock, as improved by me, I employ two series of rotating tumblers, one to operate the main bolt, and the other to operate a stop against the main bolt, which, according to its position, either holds the bolt in place to prevent it from being thrown back, or leaves it free to be moved.

"The principle of the first part of my invention consists in combining with the main turning tumbler, that operates the main bolt, a sliding bolt and turning plate connected with the tumbler, which sliding bolt being adapted to slide within the turning plate, and the two so connected and adjusted, as that the turning plate cannot turn except when the sliding bolt is in a central position relatively to the plate and tumbler, so that this position of the sliding bolt must be attained before the bolt of the lock can be operated; the sliding bolt being provided with a keyhole which only coincides with the keyhole in the tumbler when it (the sliding bolt) is thrown out to lock the turning plate and tumbler connected therewith, so that when the said sliding bolt is in its central position, to admit of the turning of the tumbler, it shall cover the keyhole to prevent the admission of it.

"The second part of my invention consists in employing, in combination with the rotating tumbler and sliding bolt, which covers the keyhole when in a central position, to admit of turning the tumbler, a key, which, when inserted in the keyhole, will admit of removing the handle, that it may re-

main in place and admit of closing the keyhole above it, to place the sliding bolt in a central position relatively to the tumbler.

"The third part of my invention, which relates to the composition or permutation tumbler that operates the stop, to prevent the main bolt from being thrown back, consists in combining therewith a sliding bolt, which covers the aperture leading to the keyhole, and which only admits of the turning of the tumbler when it closes the keyhole, and an eccentric turning plate and thumb piece, which operates it and the sliding bolt, the said eccentric being made to traverse over and close the keyhole before the tumbler can be operated. And this part of my invention also consists in combining with the parts thus combined, a key, which, when inserted, will admit of moving the sliding bolt and eccentric over it to close the keyhole, the said sliding bolt being enclosed within a cap plate secured to the front plate of the lock, and adapted to the turning of the sliding bolt within it."

Claim.—"What I claim as my invention, is the combination of the sliding bolt with the rotating tumbler, for the purpose of locking the tumbler independently of the permutation stops.

"I also claim the turning plate, in combination with the sliding bolt and tumbler, by means of which the motions of the sliding bolt are regulated, and its combination with the tumbler effected.

"I also claim, in combination with the tumbler and the sliding bolt, the employment of a key, which, when inserted, will permit the sliding bolt, in unlocking the tumbler, to close up the keyhole over the key, by means of which combination, the tumbler must be locked to admit of inserting the key, and the key must be shut into the keyhole to admit of unlocking the tumbler.

"And finally, I claim, in combination with a rotating tumbler, and the sliding bolt by which it is locked and unlocked, the employment of the turning eccentric plate, which operates the sliding bolt, and, at the same time, also closes up the keyhole."

---

32. For an *Improved Nipper Saw-Set;* Jacob Muzzy, Eddington, Penobscot county, Maine, February 13.

Claim.—"What I claim as my invention, is the improved organization described: or, in other words, the hand-rest or handle, the arm and screw, the spring lever, the jaws or bed A, and jaw *b* of the lever, the adjustable bed screw and arm, in combination; the whole being constructed and made to operate together as described."

---

33. For an *Improvement in Apparatus for Removing Animals from Railroads;* Louis Montgilion, Elk Ridge Landing, Anne Arundel county, Maryland, February 13.

The patentee says,—"It is the object of my invention to obviate the destructive action of the common cow-catcher, while attaining all the good results of the same in clearing the track of living or other obstacles. My life-preserver contemplates not only the prevention of the destructive effects of locomotives as now used, but also the speedy removal from the track of such objects as it may chance to encounter. My invention provides for

placing the machinery in a compact form for stowage at depôts and stations."

Claim.—"What I claim as my invention, is, 1st, the manner of avoiding destructive violence to the limbs and bodies of animals, by terminating the fingers of my machine with elastic rollers, rendering the fingers capable of a limited vibration to suit the action of those rollers, and placing above the fingers a movable elastic cushion or buffer, to receive the direct action of the animal which may be thrown upon the fingers.

"2d, I also claim making the front part or fingers of an oscillating life-preserver to raise by the act of encountering an animal on a railroad, in such manner as to lift the animal from its feet clear of the track, whereby the life and limbs of the animal are preserved, and the danger of throwing the train from the track is avoided.

"3d, I also claim the arrangement of machinery, composed of the cushion, the sliding rods, the thrusting bar, the trigger, the latch bar, the latch, the notch, combined and acting to produce the effect of elevating the fingers of the railroad life-preserver when encountering an animal on the road.

"4th, I also claim the arrangement whereby the fingers of a life-preserver are, while in motion, made to receive at pleasure, a limited horizontal deviation from their ordinary line of direction, in order to arrest an animal near one side of the track.

"5th, I also claim, in combination with the T-shaped frame, and weighted oscillating frame of my lite-preserver, the jointed fingers, folding backwards, and the jointed rack frame and cushion, withdrawn and folding forwards, to produce a compact stowage when in depôt.

"6th, I also claim the jointed, revolving, elastic life-preserver, combined with a pivot-truck, having a circular bearing for friction rollers, and also having check-arms, for producing and limiting the horizontal motion of the fingers."

---

34. For an *Improvement in Setting Teeth;* F. Hamilton Clark, City of New York, February 13.

Claim.—"What I claim as my improvement, is the mode and manner of securing the cylinder in its place, by means of the perforated or solid screw passing through the bottom of said cylinder, into an opening in the root of a tooth prepared to receive it."

---

35. For an *Improvement in Water Wheels;* James Trees, Salem, Westmoreland county, Pennsylvania, February 13.

Claim.—"What I claim as my invention and improvement, is making the shell of the wheel of the peculiar form described and represented," (that of a conch or dolium shell,) "in combination with the circular plate, central core, and spiral buckets, discharging on the same side of the shell."

---

36. For an *Improvement in Spark and Gas Consumers;* David Matthew, Baltimore, Maryland, February 20.

Claim.—"What I claim as new, is the manner in which I have constructed and arranged the respective parts that constitute the inner and

outer cases of the apparatus which is placed at the top of the chimney; and also the manner in which these are combined with the fire box: that is to say, I claim the manner of constructing and arranging the trumpet-mouthed tube within the inner case, said tube being divided into two or more parts, and being made to deposit and discharge the larger portion of the sparks, by the aid of the opening between the parts. I also claim the manner in which I connect the apparatus at the top of the chimney with the furnace or fire box, by means of the tube or pipes, the cases, and the openings, thence into the fire box or furnace, for the purpose made known. I likewise claim the manner of preventing the entrance of water into the fire chamber, by the employment of the tubes M, in combination with the tubes H H'."

---

37. For an *Improvement in the Manufacture of Pearl-ash;* William A. Edwards, Clinton, Macomb county, Michigan, February 20.

The patentee says,—"The nature of my invention consists in converting the ashes into pearl-ash without leaching, and by only one boiling process of lye, instead of leaching the ashes and performing two boiling processes, in the old common way. The mode I use is by burning or scorching the ashes in a pearling oven, then boil them, then settle in settling tubs, then dip the liquor into kettles and boil to white salts, and lastly pearl in the pearling oven."

Claim.—"What I claim as my invention, is the process of first roasting or heating the ashes, once dissolving, and then pearling in the pearling oven; thereby saving the expense of the leaching apparatus and one boiling operation."

---

38. For an *Improvement in Apparatus for Warming Apartments;* Samuel Whitmarsh, Northampton, Hampshire county, Massachusetts, February 20.

The patentee says,—"My object in making this invention has been to produce an efficient, economical, and safe apparatus for heating air, by the circulation of hot water through suitable radiating vessels, and to provide the same with such a contrivance as would not only prevent explosions of the pipes or water vessels, in consequence of the generation and accumulation of steam therein, but would condense said steam, and return it in the state of water into the radiators or heating vessels. Besides the above, I have sought to regulate the supply of fuel, (in case a combustible liquid is employed,) so as to maintain an equality of temperature of the air warmed by the apparatus."

Claim.—"What I claim as my invention, is the combination of the vapor condenser, with one or more radiators, and the water chamber surrounding the furnace; also the arrangement of the said condenser, and air inlet and outlet pipes of its external case, in such manner that the cold air, previous to its entrance into the air-heating chamber, shall be brought to impinge directly against the condensing vessels. I also claim the mode of making one or more sides of the radiator serpentine in transverse section, as described."

39. For an *Improvement in Drying Machines;* Nelson E. Chaffee, Ellington, Tolland county, Connecticut, February 20.

The patentee says,—"The nature of my invention consists in providing a wheel composed of two circular sides, united together by an axle passing through the same, so as to leave a space between the said two sides, the which space I divide into four separate chambers by wire wicker work, into which I put the wool or cloth to be dried, and, by giving the wheel a greater velocity, the air impinges through the wicker work on the periphery of the wheel on the cloth or wool, and dries the same in an incredibly short period."

Claim.—"What I claim as my invention, is a wheel divided into chambers, open to the free circulation of the atmosphere around the periphery, and through the passage around the interior parts of the chamber; also for the purpose set forth. I do not confine my claim to the chambers formed of iron wires or rods; for some purposes wood would be preferable; neither do I confine my claim to four chambers in the wheel, but to two or more formed as described."

---

40. For an *Improved Block for Supporting Bilges and Keels of Vessels;* Francis Grice, Washington, D. C., February 20.

Claim.—"What I claim as my invention, is the combination of the two legs, and the horizontal table supported by them, with the pawls at their feet, and the rectangular frame and its pawls and ratchet, the whole to be acted upon by devices for giving a coincident motion of the legs towards each other, and constituting a support for the bilge or keels of vessels when taken in dock."

---

41. For an *Improved Electro-Magnetic Ore Separator;* Ransom Cook, Plattsburg, Clinton county, New York, February 20.

Claim.—"What I claim as my invention, is, 1st, the use and application of a revolving cylinder or drum, with the poles of electro-magnets on its periphery, for and to the purpose of separating the magnetic oxide of iron from the substances with which said oxide may be found associated, by causing the said electro-magnets, when revolving as component parts of such cylinder, to be successively charged to take up the ore, and subsequently discharged to part with it; the charging being effected by bringing the windings of such electro-magnets in connexion with an acting galvanic battery, and the discharging by breaking such connexion.

"2d, For the purpose of separating such ore, I likewise claim the use and application of four or more terminations to the poles of electro-magnets."

---

42. For an *Improvement in Artificial Legs;* Benjamin F. Palmer, Meredith, Belknap county, New Hampshire, February 20.

Claim.—"What I claim as my invention, is, 1st, the combination of the horizontal arm with the knee bolt, connected with a cord and spring, in such a manner as to possess a varying tendency to extend the flexed limb according to the position of the same.

"2d, I claim the use of a combination of the double coiled re-curved

foot spring with a bolt, and with downward and backward projecting arms, acting at once to flex the foot and to extend the toes.

"3d, I claim the use of a combination of the stop bolt with a movable heel.

"Lastly, I claim the manner of connecting the toe-piece with the foot, when the said toe-piece is operated on by the cord and spring to extend it."

---

43. For an *Improvement in Horse Rakes;* Samuel H. Grinnell, Charlestown, Sullivan county, New Hampshire, February 20.

Claim.—"What I claim, is the application of the crank levers and handle for rotating the rake-head, for charging and discharging the rake."

---

44. For an *Improved Attachment of Loading Muzzle of Rifles;* Danl. Smith, Scipio, Cayuga county, New York, February 20.

Claim.—"What I claim as my invention, is, 1st, the hinge attachment for connecting the muzzle to the barrel. 2d, The application of the muzzle to and for the use of the muzzle thimble for the ramrod."

---

45. For an *Improvement in Fire-Kindling Materials;* Levi T. Cheever, East Greenwich, Kent county, Rhode Island, February 20.

The patentee says,—"The particular object of my invention is to kindle fires, and in making it I have tried to combine mineral combustible materials not easily ignitable, with vegetable combustible materials, cheap, easily procurable, and of easy ignition in comparison with the mineral matters, and to do so by one or more vehicles of resinous matters and essential oils, which, when combined together, will not only possess the properties of quick ignition, and mechanically connecting the aforesaid matters, but of doing so without rendering such matters liable to crumble or fall apart during transportation."

Claim.—"What I claim, is the combination and use of the spirits of turpentine with the charcoal and other materials named, for the purpose of so softening the resinous materials of the composition as to enable them to adhere with tenacity after compression, and thereby to sustain the shocks incident to transportation without fracture."

---

46. For an *Improved Method of Attaching the Arch to the Truss Frame in Bridges;* J. D. Steele, Pottstown, Montgomery county, Pennsylvania, February 20.

The patentee says,—"My invention consists not simply in combining one arch or arches with a truss frame, as this has long been known, but in effecting this combination by securing the arch or arches to the posts alone, when the posts are so connected with the chords as to admit of changing the position of the arch or arches relatively to the chords, and of drawing together the chords to camber the truss, without changing the position of the arch or arches, whereby I am enabled to camber the truss and to regulate and distribute the weight and strain equally at pleasure."

Claim.—"What I claim as my invention, is combining the arch or arches with the truss frame, by attaching it or them to the posts above, (in contra-distinction to the diagonal braces,) when the said posts are so connected with the chords as to admit of drawing them together without changing the position of the arch or arches, and of changing (by the same means) the position of the arch or arches relatively to the chords."

---

47. For an *Improvement in Brick Presses;* Valentine Roth, Evansville, Vanderburg county, Indiana, February 20.

Claim.—"What I claim as my invention, is, 1st, the combination and arrangement of the two horizontal circular revolving mould plates, for moulding the brick, with the tub, revolving shafts, and pressers, and conveying the brick to the discharging pistons simultaneously in opposite directions, the gearing being so arranged as to cause the rotating mould plates and reciprocating pistons to have the motions and pauses as herein set forth, for moulding and discharging the brick."

---

48. For an *Improvement in Short Slide Valves for Chamfering the Corners;* Jas. Mulbury, Parkesburg, Chester county, Pennsylvania, February 20.

The patentee says,—"My improvement consists in making the sides of the steam ways in the seat of the valve, and the sides of the steam way in the valve or slide, join their respective faces by rounded or flattened corners; also the joining of the outer sides of the seat, and that of the outer sides of the slide, with their respective faces by rounded corners."

Claim.—"What I claim, is the rounding or flattening of the corners joining the sides of the steam ways in, and the outer sides of the seat of the valve with, its face. Also the face of the valve or slide being joined to the sides of the steam cavity therein, and to its outer sides, by corners rounded or flattened as set forth."

---

49. For an *Improvement in Self-Acting Registers for Stoves;* Lathrop S. Bacon, Le Roy, Genessee county, New York, assignee of W. Race, Seneca Falls, Seneca county, New York, February 20.

Claim.—"What I claim as my invention, is the arranging and combining the respective parts of my improved stove registering apparatus with each other, and with a stove, in such a manner that the expansion and contraction of the stove itself, (or the portion of it with which the registering apparatus is combined,) shall operate the register or damper plate, and thereby regulate and govern the admission of air to the chamber of combustion."

---

50. For a *Fluid Metre;* William Henry Lindsay, City of New York, February 20.

The patentee says,—"The object sought by the use of the fluid metre is the direct measurement, and registration by means of a counter, of the quantity of fluid which has passed from one or more vessels into, and been discharged from, a cylinder of any given diameter and length."

Claim.—"What I claim as my invention, is, 1st, the described machine or mechanical combination, for the measuring or ascertaining the cubical or other quantity of a fluid that may pass, or be forced by mechanical or other means, through it, with the self-registration of the same by means of a counter or other suitable contrivance.

"2d, The making or leaving a sufficiency of space above or beyond the port leading into the chamber in the cylinder, to allow the piston to pass above or beyond the port, or any portion of it, with the object or intent of providing an escape for the fluid forced into the cylinder from the feed pump, in case of the metre failing to act, from an accident by breaking of the rods, or from other causes.

"3d, The use of the pneumatic pump or pumps, or springs, whether of metal or other material, for the purpose of assisting the return of the piston during the exhaust or upward stroke of the feed pump plunger."

---

51. For an *Improvement in Machinery for Turning Right and Left Lasts, &c., from the same pattern;* Samuel Huntington, Middlefield, Otsego county, New York, February 20.

The patentee says,—"The nature of my invention consists in the construction of a machine for turning irregular shapes."

Claim.—"What I claim as my invention, is the arrangement and combination of the vibrating beam and cutter wheels with the revolving centres, so as to produce at one time, and from one pattern, a right and left last, or a series of right and left lasts, or work of like character."

---

52. For an *Improvement in Apparatus for Current Wheels;* James Secor, St. Louis, Missouri, February 20.

The patentee says,—"The nature of my invention consists in forming on a disk a reaction wheel, with buckets attached by their inner extremities to the disk. The radius of curvature of the buckets increases towards their outer extremities, but their general position is such, that a straight line, drawn from the outer to the inner extremity of a bucket, is nearly at right angles to the radius from the centre of the axle to the inner point of the bucket. At the inner extremities of the buckets, and on the side opposite to the disk, is a flat ring to which they are connected, and beyond the outer periphery of which they project to the same distance as they do beyond that of the disk."

Claim.—"What I claim as my invention, is the manner of regulating the action of my reaction current wheel, by combining it with a wicker gate, of which the opening is regulated, held stationary, or inverted, with an inversion of current.

"I also claim the combination of vertical wings, having inclined flanches, passing under the floor of the channel leading to my mill, with the reversable wicker gate above described.

"I also claim the combination of machinery by which I hold stationary the wheels of the governing apparatus of my wicker gate, not confining myself to the exact arrangements of the parts set forth."

53. For an *Improvement in Churns;* Charles Murdock, Baltimore, Maryland, February 20.

The patentee says,—"The nature of my invention consists in combining with the ordinary dash churn, a hollow perforated cylindrical dash, secured to the lower end of the common dash-staff, which staff is perforated in the centre vertically, to permit it to move up and down over a central vertical stationary guide-spindle, fixed permanently in the centre of a stationary cylindrical block, of less diameter than the hollow cylindrical dash which moves over it in its descent and ascent, the motion of the dash staff being similar to that of the common churn, but the effect being to fill the hollow cylindrical dash, at each ascending movement, with air admitted through the head of the churn tub, and to convey said air down through the cream or milk, until it is met by the central stationary block, when it is compressed in the cylinder, and forced radially through the apertures in the cylindrical dash into the cream."

Claim.—"What I claim as my invention, is the combination of the hollow cylindrical dash, perforated around its periphery near its lower or open end with a number of small apertures for the air to pass through, and the central guide-spindle and stationary cylindrical central block, over which the cylindrical dash works, with the ordinary upright tub churn."

---

54. For *Improvements in Machinery for Turning Irregular Forms;* John Kimball, assignee of Jas. M. Eddy, Boston, Massachusetts, February 20.

Claim.—"I claim the manner in which I construct and operate the cutters of my machine. I also claim the vibrating frame, its shaft, pulleys, and bolts, in combination with the driving shaft and its driving pulley, the cutter carriage and its drums or pulleys; the whole being made to operate together in manner and for the purpose of imparting to the cutters a continual revolving power, during the reciprocating rectilinear movements of the cutter carriage. And I claim also, in combination with the mechanism for cutting or reducing the wood or block, the mechanism by which said wood or each block and the pattern are partially and simultaneously rotated at regular intervals of time, for the purpose of bringing the cutters to act on a fresh surface or surfaces of the wood or block; the said mechanism consisting of the gear wheels on the pattern and block mandrils, the worm gears or screws, the shaft, the pulley *c'*, and spring pawl, the ratchet wheel, the weighted cord, lever, stop, and projections from the pulley, &c."

---

55. For *Improvements in Carding Engines;* Jeptha Dyson, Fulton, Sumpter district, South Carolina, February 20.

The patentee says,—"The principle of the above improvement consists in the employment of two cylinders, surrounded or clothed with teeth of metal in the form of wire, or other form adapted to the end in view, mounted with proper journals, on suitable bearings, below the main cylinder of the carding engine, at any convenient point, between the feeder or licker and the doffer cylinder, and driven by the main or other shafts of the carding engine, and so adjusted as to operate on the surface of the main cylinder, and upon the surface of each other, and to strip and clear the main cylin-

der to the extent required, and return the strippings to the main cylinder to be carded over and delivered to the doffer cylinder; it being a leading principle in the said improvement to adjust the number or quantity of teeth in the stripping or clearing cylinder, in such a way as to cause it to remove the strippings in such limited quantities, in each revolution of the main cylinder, as will always enable the latter to deliver a sufficient amount of the carded material to the doffer cylinder, and with due regularity."

Claim.—"What I claim as my invention, is the cylinder A, surrounded or clothed with a spiral fillet of metal teeth in form of wire, or with teeth of metal of the form and description mentioned and described on the 4th specification, as arranged and employed in the 3d and 4th specifications, in combination with the main cylinder C, and with the cylinder B, or with the main cylinder only, to strip and clear the latter by a self-acting contrivance, whilst the carding engine is in operation.

"I also claim the cylinder B, in combination with the cylinder A, and the main cylinder C, as applied to receive the strippings from the former, and to deliver them to the latter."

---

56. For an *Improved Cartridge Tube and Conveyor, forming a fire-arm;* Christian W. Büchel, City of New York, February 20.

The patentee says,—"The nature of my invention, consists in constructing fire-arms with a chamber for containing the ammunition, in such a form as to be readily transferred to the barrel of the gun by apparatus prepared for that purpose, by means of which the gun can be discharged many times in rapid succession, the whole being combined in a neat and portable form."

Claim.—"What I claim as new, is, 1st, the cartridge tube, constructed in the manner and for the purpose set forth. I also claim the tube for conducting the cartridges into the barrel.

"2d, I claim the follower for forcing forward the cartridges in the cartridge tube, in combination with said tube."

---

57. For an *Improvement in Cooking Stoves;* James L. Norton, Perry township, Jefferson county, Pennsylvania, February 27.

The patentee says,—"The nature of my improvement consists in constructing the double bottom of the oven so as to make the inclined back to the front flue of the fire place like a Franklin stove, and admitting cold air at the lower angle thereof, which ascends through the oven, and is carried off through a hole in the top of the oven, either into a pipe, when required for heating apartments, or into the flue, when cooking in the oven."

Claim.—"What I claim as new, is, 1st, the combination of the air chamber below the oven, and the movable pipe for conveying off the hot air. And lastly, I claim, in combination with the double flues, the projection rising above the back flue before it contracts into the size of the pipe."

58. For an *Improvement in Flood Fences;* Henry Reichert, Shippensburg, Cumberland county, Pennsylvania, February 27.

Claim.—"What I claim as my invention, is the combination of the hinged falling posts with buoyant notched levers, for letting down the panels, by the rising of the water acting on said buoyant levers.

"I also claim the combination of the spring with the panel, for holding the panel when thrown down by the flood, to prevent its being raised by the rising of the water, as described."

---

59. For an *Improved Detached Metallic Cartridge Tube, &c., for Fire Arms;* David Minesinger, Beaver, Beaver county, Pennsylvania, February 27.

The patentee says,—"The nature of my invention consists in making the external surface of my metallic cartridge tube of the form of the frustrum of a cone, and the internal surface cylindrical, which causes the muzzle to be thinner than the breech, so that when the piece is discharged, the heat from the explosion of the charge will expand the muzzle instantaneously on account of its thinness, and cause it to close the joint between the metallic cartridge tube, and the chamber of the gun barrel into which it is inserted, and thus prevent any part of the explosion escaping at the breech except that which issues from the vent, and also preventing the same degree of recoil as in the use of the cylindrical metallic cartridge chamber, the points of friction being in annular circles from the muzzle of the tube to the breech against the interior surface of the chamber of the gun into which the cartridge is inserted, which chamber is made of corresponding shape and size to that of the external surface of the cartridge tube. Also in making the bore of the metallic cartridge tube, next the breech, the shape of a parabola. Likewise in giving the vent an angular direction, from the nipple to the centre of the parabolic end of the chamber for the charge. Also in the employment of a hinged holder, for holding the metallic cartridge tube firmly in the chamber of the gun barrel, with the muzzle close against the shoulder formed in the chamber of the barrel, and preventing any recoil of the cartridge tube at the discharge of the piece; the hinges by which it is connected to the barrel allowing of its easy and ready insertion and removal during the operation of changing the tube in firing the gun in quick succession, being in the most convenient position on the gun, and always in operation."

Claim.—"What I claim as my invention, is, 1st, the hinged holder and cap, in combination with the frustrum of a cone metallic cartridge tube."

---

60. For an *Improved Machine for Dressing Nuts and Bolt Heads;* Julius King, Bordentown, Burlington county, New Jersey, February 27.

Claim.—"What I claim as new, is the combination of the twin cutters with the sleeves, or other equivalent device for gauging their distance apart, and with the mandril upon which they are mounted, whereby the sides of nuts and bolt heads are finished in less time, and with a machine of less size and cost, than where only one cutter is used."

61. For an *Improvement in Presses;* David M'Comb, Port Gibson, Claiborne county, Mississippi, February 27.

Claim.—"What I claim as my invention, is, 1st, the combination of the pulley, rope, and central vertical shaft, by which the power is applied beneath the centre of the follower, in such a manner that the rope, in winding on the shaft, will not ride or touch the adjacent coils, and consequently will not be liable to wear, rub, or chafe, said rope being, in a single length, conveyed through an opening in the shaft, and attached by its extremities to the connecting pins of the two toggles; the pulleys around which the rope is passed being arranged in pairs on the horizontal joint, or connecting pins of the toggles, outside the same, by which arrangement their diameter can be increased or diminished at pleasure; and the shaft being of the diameter of the width apart of the pulleys, so that the rope shall be drawn in straight parallel lines as described, to prevent rubbing against the flanches of the pulleys.

"2d, I also claim the combination and arrangement of the hinged shutters with the followers for shutting the bagging and ropes into corresponding depressions in the sides of the same, so as to prevent them from getting out of place whilst the follower is descending, as before described, preventing entanglements and derangement of the ropes and ends of the bagging in lowering the follower into the box.

"3d, I likewise claim making the drag in the form of a segment of a circle, with a joint and key, arranged and operated in the manner and for the purpose described and set forth.

"4th, I also claim inclining the four hanging posts of the frame inward, by which the shoes of the toggles are sustained perpendicularly under the outer ends of the follower, whilst the required length and width of the cotton box is obtained."

---

62. For a *Protector Slide for Door Locks;* George F. J. Colburn, Newark, Essex county, New Jersey, February 27.

The patentee says,—"The nature of my invention consists in attaching to the cap of the ordinary rim lock a movable slide of brass or iron, having an oblong aperture in the middle, made to clasp the spindle, the end of the slide being widened on the lower side to cover the keyhole, and notched in square on the end to clasp the pin of the key, the slide being shoved in, the spindle, key, and keyhole are locked, defying the burglar from without."

Claim.—"What I claim as my invention, is the application to the ordinary rim lock of a metal slide, which will at the same time cover the keyhole, protecting the lock from being picked or opened from the outside; prevent the key from being turned by the application of instruments to the pin, or its dropping out by the slamming of the door, and retain the knob spindle in a fixed position, rendering it inoperative on the latch, thereby converting the latch into an additional bolt."

---

63. For an *Improvement in Weavers' Temples;* Lewis K. Day and Preston Day, Sacarappa, Cumberland county, Maine, February 27.

Claim.—"We claim as our invention, the combination and arrangement

of the following parts, viz., 1st, the jaws; 2d, the arm B and its joint pin; 3d, the lever; 4th, the spring; 5th, the tablet or support piece; 6th, the arm I, with its spring and stud; the whole being constructed and applied together as described, and so as to operate essentially as specified."

---

64. For an *Improvement in Jaw Temples for Looms;* Geo. Draper, Ware, Hampshire county, Massachusetts, February 27.

Claim.—"What I claim as my invention, is the cam *i*, and lever, (applied to the breast beam,) in combination with the inclined plane or cam *e*, projection *k*, or any mechanical equivalent therefor, as connected with the lay, the whole being applied to the temple, and made to operate as specified."

---

65. For an *Improvement in Gas Apparatus;* Amaria Pierce, Philadelphia, Pennsylvania, February 27.

Claim.—"What I claim as my invention, is, 1st, the ribs or flanches around the retort; 2d, the passing of the lower end of the retort through the fire grate, so as to connect it directly with the condenser; and 3d, the immersing of the lower end of the retort in water or other suitable fluid; all of which being constructed, arranged, and operating in the manner and for the purpose described."

---

66. For an *Improved Metallic Packing for Pistons;* William Wright, Providence, Rhode Island, February 27.

The patentee says,—"My invention consists in making elastic metallic packing for the pistons of steam engines of two cut rings, one within the other, and each made of a gradually reduced thickness towards the ends, so that, when inserted one within the other, the outer and the inner peripheries of the compound ring shall be concentric, whilst the line of separation between the two shall be eccentric, when this is combined with a projecting pin which lies in the space between the ends of the inner ring, to retain the thickest part of one ring always opposite the open and thinnest part of the other."

Claim.—"What I claim as my invention, is the making of metallic packing for the pistons of steam engines of two cut rings, one within the other, the outer and the inner peripheries of the compound ring being concentric, and the division between them eccentric, substantially as described; when this is combined with the mode of keeping the two rings with their thickest parts on opposite sides of the common centre, by the projecting pin attached to the outer ring, and the plate embraced by the ends of the outer ring, to cut off the passage of the steam, as described."

---

67. For an *Improvement in the Manufacture of Hubs and Axles;* Stephen R. Hunter and Mead Merrill, Cortlandtville, Cortlandt county, New York, February 27.

The patentees say,—"The first part of our invention relates to the construction of carriage wheels of wrought iron, and steel, and cast iron, and

consists in making the inside and outside of the hub of sheet iron or steel, with a sheet metal washer at each end, and the spokes, which are made of thin steel or other metal, riveted or otherwise secured to the rim of the wheel, and let into the outer case of the hub, and formed with a mortise or indentation, where this is combined with the method of firmly securing the whole, by running cast iron into, and filling up the space within, the hub. And the second part of our invention relates to the construction of the axles of carriages, and consists in making the arm of the axle of sheet iron, bent to the required form, and secured into a steel or wrought iron axle by running cast iron into the space between."

Claim.—"What we claim as our invention, is the method, substantially as herein described, of making the hubs of carriage wheels, by forming the inner box and outer case or surface of sheet metal, and uniting them by filling the inner with cast iron, by running the molten iron in between them, as described; and, in combination with this method of forming the hub, we also claim the method of securing the spokes, by inserting their inner ends in the outer case of the hub, that the cast iron within the hub may run around and secure them in place, as described.

"And we also claim the method of forming the axles of carriages, by making the outer form of the arm of the axle of sheet iron, when this is united to the steel or wrought iron axle within by means of iron cast in the space between the two, as described."

---

68. For an *Improvement in Machinery for Separating Flour from Bran;* Issachar Frost and James Monroe, Albion, Calhoun county, Michigan, February 27.

Claim.—"We claim to be the original and first inventors of the combination and arrangement of the external upright stationary close cylindrical case, with the internal combined punched and reticulated upright stationary scourer and bolt, and revolving cylindrical scourer and blower, constructed, arranged, and operated in the manner and for the purpose herein fully set forth, by which the fine flour that usually adheres to the bran, after being subjected to the first bolting operation, is now completely separated from the bran and collected in the annular space between the cylindrical bolt and cylindrical case, from whence it descends through the segmental openings in the horizontal base upon which the said bolt and case rest, into conducting spouts, as aforesaid; whilst the bran is blown from the interior of the bolt through a spout leading through the external case, as aforesaid; the meshes of the bolting cloth being kept open by the pressure of air produced inside the combined cylindrical scourer and bolt, by the manner in which the oblique, and radial, and parallel wings are arranged on the revolving scouring and blowing cylinder, as set forth."

---

69. For an *Improvement in Suspending Telegraph Wires;* Elijah Pratt and Raymond Graverend, City of New York, February 27.

The patentees say,—"The nature of our invention consists in suspending a stretched gum elastic band, cord, or tube, on posts or other suitable permanent fixtures, on or through which a wire is suspended through the

air for distances of great length, for the passage of telegraph wires across rivers, and in other similar situations."

Claim.—"What we claim as new, is suspending telegraphic wires across rivers, by means of a stretched gum elastic band or tube, in the manner and for the purpose set forth."

---

70. For *Improvements in Brakes for Cars;* William Stinehart and John Taggart, Charlestown, Middlesex county, Massachusetts, February 27.

Claim.—"What we claim as our invention, is the stationary support plate, (composed of one plate or two plates,) the hinged flap, and the confining bolts, (or other mechanical equivalents,) in combination together, and as applied to the brake lever, and made to sustain the rubbing piece of wood, in the manner and for the purpose as specified."

---

71. For an *Improvement in Horse Rakes;* Calvin Delano, East Livermore, Kennebec county, Maine, February 27.

Claim.—"What I claim as my invention, is so making horse rakes, by hanging the head or heads on one common rod or pivot, as to allow each tooth to have a separate and independent movement, to enable the rake to pass over small as well as large obstructions, without disturbing the action of any of the contiguous teeth beyond the obstructing body."

---

RE-ISSUE.

1. For an *Improvement in Bee Hives;* Abraham Sanburn, Sycamore township, Hamilton county, Ohio; patented March 26, 1845, re-issued February 13, 1849.

The patentee says,—"The nature of my invention consists in providing an artificial harbor or place of refuge for the bee-moth or miller, so arranged and located that she will invariably seek and secrete herself in the same, whether attacked or not attacked by the bee.

"Another part of my invention consists in baiting this place of refuge with bee-grubs, bee-bread, honey, or comb, for the purpose of reducing to a certainty the advent of the moth thereto, as her instincts tell her that she will there most readily find and reach a refuge for herself, and food for her progeny.

"Another part of my invention consists in suspending the floor from the hive, by means of wire hooks and staples, or other equivalent devices, at a suitable distance (say $\frac{3}{8}$ths of an inch) from the bottom of the sides of the hive, so that the bees and the bee-moth or miller can have uninterrupted ingress and egress, (the bees to the hive, and the miller to the harbor,) and also for the purpose of ventilating the hive sufficiently and at all seasons."

Claim.—"What I claim as new, is providing a harbor or place of refuge for the bee-moth or miller, which admits of her free ingress and egress thereto, to secrete herself and lay her eggs undisturbed by the bees, the entrance to the trap not being of sufficient size to admit the passage of the bee. I also claim as original, the combination of the moth-trap or harbor, before described, with the suspended hive, constructed and arranged in the manner set forth."

## MECHANICS, PHYSICS, AND CHEMISTRY.

*Lectures on Static or Franklinic Electricity, delivered before the Royal Institution. By* PROF. FARADAY.*

The annual course of lectures, by Professor Faraday, commenced this day, (April 21,) the subject being "Static or Franklinic Electricity." In his commencing observations, the Professor alluded to the difficulty he experienced in varying the subjects of his annual lectures, and said that he should, in the present course, return to the subject of frictional electricity, and begin with the simplest modes by which it is excited.

Taking a piece of amber, and rubbing it on his coat sleeve, he then brought it near to a suspended magnetic needle, with a gilt ball at each end. The attraction to the needle to the amber showed that the friction had, in some measure, imparted to it a power which it had not before possessed, though the amber had not apparently undergone any change. It was to the consideration of this power, and to its extraordinary effects, that the attention of his audience would be directed, for in whatever manner it might be excited, and how various soever the degrees in which it was manifested, the electricity produced by rubbing the amber was the same power, and was capable of being accumulated into a destructive force.

The Professor exhibited several modes by which electricity may be excited, and the effects of its attraction on various bodies. The following are some of the experiments, which may be readily repeated by any one. A glass rod rubbed with a piece of dry silk, on which an amalgam of tin, quicksilver, and zinc had been spread, was brought near two eggs, which then rolled about the table as if they had been animated. Some sulphur was then pounded in a mortar, and scattered on the plate of a gold leaf electrometer, the leaves of which instantly diverged—thus proving that electricity had been excited by the friction of the particles in falling. The grinding of coffee produced a strong development of electricity as it fell from the coffee-mill. Every sort of body admitted of the excitation of this mysterious force, but none more readily than gutta percha.

Most of the electrics, or those bodies which are most readily excited, are combustible substances, such as resin, shellac, sulphur, and gutta percha; and it might have been inferred from this fact, that the carbon and hydrogen which enter largely into the constitution of combustible bodies, were essential to the excitement of electricity; but this inference would be found very erroneous.

Gun cotton and gutta percha were adduced as substances varying essentially in their chemical composition, and yet were two of the most easily excited electrics. The quantity of carbon, or charcoal, in gun cotton is so great, that even when burnt in oxygen gas, to effect its combustion in the most perfect manner, a great quantity of smoke and soot is evolved; whereas the explosive portion of gun cotton contains so large a quantity of oxygen that it explodes without any smoke.

The consideration of the accumulation of frictional electricity was illustrated by several experiments, the most remarkable of which was the set-

* From the London Mining Journal, Nos. 714, 717, 718, 719.

ting fire to a jet of gas with the electricity excited on a sheet of paper. The paper, after having been warmed, was rubbed briskly with India-rubber, and then applied to a disk of metal mounted on a glass rod. The metal surface served to conduct and concentrate the electricity spread over the paper, so that a spark was emitted when the brass pipe of the gasometer was brought near it, and the issuing gas was inflamed. In the dark, flashes of light may be seen when dry paper is rubbed with clean India-rubber. The accumulation of electricity by the electrical machine was referred to, and one of the earliest forms of an electrical machine was exhibited. It consisted simply of a glass globe with a neck, which was mounted on a stand with a handle to turn it, and without any conductor.

Having shown the accumulating power of the large electrical machine belonging to the Institution, the Professor next exhibited the excitement of electricity by other means than friction, as by heated tourmaline, by melted sulphur, and the evaporation of water. He concluded with some general observations on the mysterious nature of electrical force and its alliance to the other powers in nature, expressing his firm belief that all the properties of matter and the actuating principle of organic and of inorganic bodies depends on electricity.

*Second Lecture.*—Mr. Faraday said he should, in the present lecture, confine himself to the consideration of the nature of electrical force, which, in the preceding one, he had shown the various means of exciting. The opinions of early electricians respecting the nature of the forces excited by the friction of electrics were stated, for the purpose of showing the impressions which such strange phenomena were calculated to produce when first known, and also as a caution against mingling theory with fact in the statement of any observed effects.

One of the most remarkable characteristics of electrical force is its power of attraction and repulsion; which two opposite forces are always found together, like cause and effect, and may be inverted; so that the electric which at one moment attracts will in the next moment repel. Several experiments illustrative of the repulsive power of electricity were exhibited, the most curious of which was the repulsion of a small balloon inflated with common air; the repelling power imparting to it an apparently ascending force, which raised it in the air. The two forces of attaction and repulsion seem, Mr. Faraday observed, to arise from the presence of two kinds of electricity, and in the early stages of the science the apparent existence of two kinds of electricity became known, one of which, being excited by glass, was called vitreous, and the other, being excited by resin, was called resinous electricity.

Mr. Faraday cautiously guarded himself from affirming positively that there are two kinds of electricity, but he said that there appeared to be two different electrical conditions, and he should, therefore, adopt the usual phraseology in speaking of electricity as consisting of two kinds. To show the distinction between vitreous and resinous electricity, a small gilded balloon was suspended, to which electricity was imparted, first by an excited glass rod, and afterwards by a rod of shellac. The effects of attraction and repulsion were the same in each case separately, but when the balloon was repelled by the glass it was attracted by the shellac; when

the latter repelled it the glass attracted; and when the glass rod and the shellac together were brought near the balloon, the opposite electricities neutralized each other, and no effect whatever was produced. These experiments proved that what one kind of electricity can do, the other kind can do, but that when they are both united their forces are destroyed.

Though appearances thus show that there are two kinds of electrical force, there is no evidence of the existence of a third kind, for notwithstanding the varieties of substances by which electricity can be excited, the electricity is in every case either vitreous or resinous, and no other. It is one of the laws of electrical action, that bodies similarly electrified repel each other; and it is on the application of this property that the action of electrometers depend, the gold leaves or the pith balls diverging in consequence of each one being charged with electricity of the same kind.

An easily constructed and rather sensitive electroscope was put together by Mr. Faraday. It consisted of a watch glass laid on the table, with its convex surface uppermost; on this was placed a small piece of flat glass, and upon the flat surface was balanced a thin lath, which was very easily attracted or repelled by an excited electric.

The facility with which electricity may be transferred from one body to another was shown by means of a small metal ball suspended by a silk cord, which, when applied to an electrified metal globe, became instantly charged with the same kind of electricity.

The induction of different kinds of electricity in a metal globe divided in two was also exhibited. Each half was mounted on a glass insulating stand, and after being placed together an excited glass rod was held near to one of the hemispheres. Whilst the electric continued to be held near, the other hemisphere was removed; and when the electrical condition of the two was examined, one was found to be charged with positive or vitreous electricity, and the other with negative or resinous electricity.

Mr. Faraday concluded by directing attention to the distinction between the transfer of electricity and the conduction of heat; for in the case of electricity the whole of it may be removed, so as to leave the body in an absolute state of zero, whilst the conduction of heat only lowers the temperature, and it is impossible, by any known means, to abstract the heat entirely.

The *Third Lecture* by Mr. Faraday on Static Electricity, was principally devoted to the consideration of the transference of electricity from one body to another. He introduced the subject, however, with some further examples of the existence of two kinds of electricity, observing that the chief characteristic of electrical force is its duality; and that no power is manifested until the two kinds of electricity are separated. In illustration of this fact, a rod of shellac, to which a flannel cap was fitted, was excited by twisting it round a few times; but no manifestation of the presence of electricity was afforded by the most sensitive electrometer until the flannel was separated from the shellac, when each exhibited strong evidence of being highly excited, and with electricity of opposite kinds. The properties which some bodies possess of conducting electricity much more readily than others is so important, that were it not for the imperfect manner in which some substances conduct, no such power as electricity would be

known; for as soon as it was excited it would be conducted away. The difference between electrics and non-electrics seems to depend on their differing conducting powers; for a rod of brass, which exhibits no electrical property whatever, when held on the hand and rubbed becomes highly electrical when mounted on shellac, which, being a bad conductor, prevents the electricity from passing off to the earth, as it does when the brass is held in the hand.

Mr. Faraday observed that there are no absolute non-conductors of electricity, for all bodies conduct, though the degrees of their conducting power are almost infinitely varied. Even the metals vary very materially in their conducting powers, and in this respect there is some analogy between the conduction of heat and the conduction of electricity.

Two similar rods, one of iron the other of copper, were heated by the application of a spirit lamp to one of their ends, and a number of balls were stuck to the rods with cerate at different distances, so that as each rod became heated the cerate melted, and the balls fell in succession. The rod of copper conducted the heat so much quicker than the iron, that all the balls from it had fallen off when half of those on the iron remained.

Several experiments were performed for the purpose of illustrating the differing degrees of conductibility of different substances, and to show that a bad conductor may, by increase of quantity, draw off as much electricity as a good conductor when of small size. When a thin lath was reared against the prime conductor of the electrical machine, so as to communicate with the earth, but a small portion of the electricity was drawn off by it, as was shown by the length of the spark; but when a thicker piece of wood was substituted the length of the spark was greatly diminished.

The superior conducting power of water, compared with silk, was shown by connecting two insulated pieces of metal with a silk string, under which circumstances no appreciable amount of electricity was transferred from one to the other; but when the string was wetted with water the electricity passed freely. The best of conductors, however, offer considerable resistance to the passage of electricity; and in discharging a Leyden jar through about 40 feet of thin copper wire, it was shown that the electricity preferred passage through a small space of air, through a non-conductor, to traversing the whole length of the wire.

The effect of carpets in obstructing the passage of electricity was shown in a curious manner. Mr. Faraday, when standing on a carpet, and being in connexion with the prime conductor of the electrical machine, set fire to a jet of gas by bringing his finger near it, the carpet acting in that case in the same manner as an insulating stool.

A facile mode of constructing an insulating stool of the most effective kind was shown, for the advantage of those who have no regular apparatus. Four glass tumblers inverted, with a piece of gutta percha on each, and with a quarto volume for a top, serve all the purposes of an insulated stool; and, as gutta percha is a very bad conductor, such a stand is a more effective insulator than an ordinary glass stool.

The transferrence of electricity by convection is distinct (Mr. Faraday remarked) from the ordinary conduction of electricity, as in the former case the electricity is transferred by being carried from one body to another. Several instances of this kind of transferrence of the power was shown, the

emission of electricity from points being the most curious. When a metal point is attached to the prime conductor, scarcely any signs of electricity can be obtained from it, as the point carries it off. A visible representation of this mode of transference was afforded by putting melted sealing wax on a metal point, when the convective force carried the wax against a sheet of paper in the most delicately minute fibres, finer than those of a spider's web.

In the next lecture, it was announced, the phenomena of induction will be considered.

*Fourth Lecture.*—The curicus property and phenomena of induced electricity formed the principal subject of the discourse, which was illustrated with a great variety of well-contrived and curious experiments.

In the first place, he exhibited the simple phenomenon of induction, by showing the action of an excited glass rod at a distance from the electrometer, and its power of communicating electricity to an insulated brass cylinder without touching it, and by that means setting fire to gas. The induction of electricity in these instances takes place through the air, which is a non-conductor, and the power increases when more perfect and solid non-conductors are used, as was exhibited by interposing a great thickness of sulphur and shellac between the electric fluid and the electrometer. The more perfect insulators transmit induced electricity with greater facility than imperfect ones; and it has been ascertained that sulphur is $2\frac{1}{4}$ and shellac $2\frac{1}{2}$ more effective than air in transmitting induced electricity. The power which one electrified body possesses in inducing electricity in all other bodies has no known limit, and may be supposed to extend through infinite space, though the intensity diminishes in a greater ratio than the distance.

As an illustration of the extended influence of induction, a large metal globe was suspended at a considerable height in the lecture room, and having been charged with electricity, the extent of its influence was shown by collecting electricity, by holding a small piece of insulated gold paper towards it, by which means sufficient electricity was collected to diverge the leaves of the electrometer. The charged metal globe, Mr. Faraday said, might be considered as a small thunder cloud; and in a subsequent lecture, when treating of atmospherical electricity, he should have to remark on the important effects of induction on the large scale.

A very remarkable characteristic of static electricity is, that one kind of electricity cannot be excited without the other kind, and this is peculiarly manifest in electrical induction. When an excited glass rod is held near to any body, the glass, being positively electrified, induces negative electricity in that part of the body nearest to it, and positive electricity in the part most remote. If the body be insulated, and the positive electricity be drawn off by a momentary connexion with the earth, it is left in a negative state when the glass rod is withdrawn.

For the purpose of showing that, when electricity is induced in metals, they convey it along their surfaces only, and that the inside of a metallic vessel contains no electricity, an ice pail was electrified, and though the outside gave abundant evidence of electricity, a metal ball lowered inside to the bottom did not effect the electrometer. A white mouse was enclosed

in a wire gauze cage, and being placed on an insulated stand, and connected with the electrical machine, very powerful sparks were taken from all parts of the gauze without disturbing the mouse, which seemed quite unconscious of the miniature lightning storm around it. As a further illustration of this curious property, several brass pillars were arranged in a circular form on an insulated metal stand, and though there was the space of half-an-inch between each pillar, the interior of the skeleton cylinder gave no trace of electricity, which was emitted in strong sparks from the outside of the rods.

Induction affords an explanation of the apparent repulsion of bodies similarly electrified. Some strips of paper, on being held together at one end, started far apart when in connexion with the prime conductor of the machine, as if repulsive power acted on each strip, and when both ends were fastened, the strips distended in the middle like a balloon. This apparent repulsion was, however, shown to be entirely due to the attractive power induced in surrounding bodies, for when the balloon was partially inclosed by the hands, the stronger attraction caused by increased proximity, caused it to distend with much greater energy.

As electricity is induced through the intervening substance of a non-conductor, the inside of a vessel made of shellac or glass will contain electricity as well as the outer surface, in which respect non-conductors differ essentially from metallic substances.

The same principle on which Mr. Faraday explained the cause of metallic vessels not containing electricity, he also applied to explain the cause of electricity being much more readily emitted from angles and small balls than from large balls and flat surfaces; but this part of the subject was hurried at the conclusion, and was not made so clear as Mr. Faraday's illustrations generally are.

To be Continued.

---

### *A New Analogy in the Periods of Rotation of the Primary Planets.**

Mr. Sears C. Walker addressed the Association on the subject of a new analogy in the periods of rotation of the primary planets, discovered by Daniel Kirkwood, Esq., of Pottsville, Pennsylvania.

*Gentlemen:*—The subject of my present communication is contained in a letter of Mr. Daniel Kirkwood, of Pottsville, Pennsylvania, dated July 4th, of this year.

The Secretary then read Mr. Kirkwood's letter, as follows:—

*Pottsville, Pa., July 4th*, 1849.

SEARS C. WALKER, ESQ.,

*Dear Sir:*—Knowing the great interest you feel in astronomical inquiries, I take the liberty of submitting the following paper to your consideration, and respectfully soliciting your opinion as to the problem which I have been attempting to solve. Is it, or is it not, deserving of further investigation? Whatever may be your decision, as I have the fullest confidence

*Proceedings of the American Association for the Advancement of Science. Second Meeting. Held at Cambridge, Mass., August, 1849. From the Boston Evening Traveler, Sept. 7.

in your judgment, I shall at once acquiesce. Wishing to be as brief as possible, I will not trouble you at present with any statement of the considerations which suggested my hypothesis.

While we have, in the law of Kepler, a bond of mutual relationship between the planets, as regards their revolutions round the sun, it is remarkable that no law regulating their rotations on their axes has ever been discovered. For several years I have had little doubt of the existence of such a law in nature, and have been engaged, as circumstances would permit, in attempting its development. I have at length arrived at results, which, if they do not justify me in announcing the solution of this important and interesting problem, must at least be regarded as astonishing coincidences.

Let P be the point of equal attraction between any planet and the one next interior, the two being in conjunction; P′, that between the same and the one next exterior.

Let also D = the sum of the distances of the points P, P′, from the orbit of the planet; which I shall call the diameter of the sphere of the planet's attraction;

D′ = the diameter of any other planet's sphere of attraction found in like manner;

$n$ = the number of sideral rotations performed by the former during one sideral revolution round the sun;

$n'$ = the number performed by the latter; then it will be found that

$$n^2 : n'^2 :: D^3 : D'^3; \text{ or } n = n' \left(\frac{D}{D'}\right)^{\frac{3}{2}}$$

For the sake of convenient reference, I subjoin the following tables.—The masses of Venus, the Earth, Mars, Jupiter, and Saturn, are taken from your edition (1845) of Sir John Herschell's Treatise on Astronomy. Those of Mercury and Uranus correspond with my hypothesis, and are nearly identical with the most recent and reliable determinations of astronomers. In other words, the mass of Mercury is very nearly a medium between the two estimates of Encke,* while that of Uranus is more than $\frac{1}{1}\frac{7}{8}$ths of Struve's mass, $\frac{1}{2}\frac{1}{3}\frac{1}{6}\frac{1}{0}$ found by observations on the satelites.† The mean distances not being given in miles in Herschell's Treatise, I have used the table of distances in the Astronomy of Prof. Norton. For Mars' period of rotation (24*l*. 37*m*. 20·6*s*.) I have adopted the recent determination of Prof. O. M. Mitchell. (Sid. Mess. Vol. I. p. 52.)

TABLE I.

| Planet's name. | Mean dis. from the Sun in miles. | Mass. | Square root of mass. | No. rotations in one Sid. Period. | Logarithm. |
|---|---|---|---|---|---|
| Mercury, | 36,814,000 | 277,000 | 526·3 | 87·63 | 1·942653 |
| Venus, | 68,787,000 | 2,463,836 | 1569·6 | 230·90 | 2·363424 |
| Earth, | 95,103,000 | 2,817,409 | 1678 5 | 366·25 | 2·563777 |
| Mars, | 144,908,000 | 392,735 | 626·7 | 669·60 | 2·825815 |
| Jupiter, | 494,797,000 | 953,570,222 | 30879 8 | 10471·00 | 4·019988 |
| Saturn, | 907,162,000 | 284,738,000 | 16874·1 | 24620·00 | 4·391288 |
| Uranus, | 1,824,290,000 | 35,186,000 | 5931·5 | | |

* See Prof. Encke's Letter to Mr. Airy, dated Dec. 20, 1841.

† Edinburgh Philosophical Journal, for July, 1848.

The points of equal attraction between the planets severally (when in conjunction) are situated as follows:—

TABLE II.

| | Miles from the former. | Miles from the latter. |
|---|---|---|
| Between Mercury and Venus, | 8,029,600 | 23,943,400 |
| " Venus and Earth, | 12,716,600 | 13,599,400 |
| " Earth and Mars, | 36,264,600 | 13,540,400 |
| " Jupiter and Saturn, | 266,655,000 | 145,710,000 |
| " Saturn and Uranus, | 678,590,000 | 238,538,000 |

It will be seen from the above that the diameter of the earth's sphere of attraction is 49,864,000 miles. Hence the diameters of the respective spheres of attraction of the other planets, according to my empyrical law, will be found to be as follows:—

| | Diam. of Sph. of Attr'n. | Log. |
|---|---|---|
| Mercury, | 19,238,000 | 1·283704 |
| Venus, | 36,660,000 | 1·564218 |
| Mars, | 74,560,000 | 1·872479 |
| Jupiter, | 466,200,000 | 2·668594 |
| Saturn, | 824,300,000 | 2·916127 |

*Remarks.*—The volumes of the sphere of attraction of Venus, Mars, and Saturn, in this table, correspond with those obtained from Table II; that of Mars extending 61,000,000 miles beyond his orbit, or to the distance of 206,000,000 miles from the sun. This is about two or three millions of miles less than the mean distance of Flora, the nearest discovered asteroid. That of Mercury extends about 11,000,000 miles within the orbit; consequently, if there be an undiscovered planet interior to Mercury, its distance from the sun, according to my hypothesis, must be less than 26,000,000 miles. Jupiter's sphere of attraction extends only about 200,000,000 miles within his orbit, leaving 89,000,000 miles for the asteroids. It is only in the most distant portion of this space, where small bodies would be less likely to be detected, that none have yet been discovered.*

The foregoing is submitted to your inspection with much diffidence. An author, you know, can hardly be expected to form a proper estimate of his own performance. When it is considered, however, that my formula involves the distances, masses, annual revolutions, and axial rotations, of all the primary planets in the system, I must confess I find it difficult to resist the conclusion that the law is founded in nature.

Very respectfully, your obedient servant,

DANIEL KIRKWOOD.

—

Mr. Walker then remarked, that it would be noticed from the contents of the letter, that Mr. Kirkwood offers for the consideration of the members, a subject of great interest to the cultivators of physical science.

* It may be proper to remark that *one planet* between Mars and Jupiter, with a mass and mean distance of about double those of the former, would perfectly satisfy the conditions of my theory.

The slightest approach to an analogy, such as constituted any one of Kepler's harmonies, three of which turned out to be his three celebrated laws, should be examined with care, in order that its merits, if it have any, should not be overlooked.

Accordingly he proceeded at once to verify the numerical data and conclusions of Mr. Kirkwood. He found in them nothing requiring modification, except perhaps the substitution of some more recent values for the masses of Mercury and Uranus. He therefore communicated the subject confidentially to the American Philosophical Society, during his stay at Philadelphia, at their stated meeting, July 20; and in like manner, on the 23d, to Joseph Henry, LL. D., Secretary of the Smithsonian Institution. The next day he replied to Mr. Kirkwood.

The Secretary then read Mr. Walker's letter to Mr. Kirkwood, and the reply of the latter, as follows:—

*Washington, July* 24, 1849.

To Daniel Kirkwood, Esq., Pottsville, Pa.

*Dear Sir:*—Absence from the city, and pressing business, have prevented me from sooner answering your esteemed favor of the 4th.

I have tested your theorem with the most recent values of the masses of the primary planets, viz., those used by Encke in 1845, with the exception of Uranus, for which I used Adams's recent value, $\frac{1}{21\,000}$.

I find your quantity $\frac{n}{D^{\frac{3}{2}}}$ to be nearly constant for the primany planets Venus, the Earth, and Saturn. Such a coincidence is hardly attributable to chance, and seems to indicate a law of nature.

Doubtless, in your researches on the subject, your attention has been turned to Laplace's nebular hypothesis, from which one of your elements, viz., ($D$), is derived.

I think that the form of your constant may be readily deduced from the nebular hypothesis, in which case both theories will strengthen each other.

The subject is highly interesting to men of science, and I shall be glad to make your discovery public, through the medium of some of our public journals and scientific memoirs. Please let me hear from you at an early date.

Yours truly and respectfully,

Sears C. Walker.

—

*Pottsville Academy, July* 31, 1849.

Sears C. Walker, Esq., Washington, D. C.

*Dear Sir:*—Your favor of the 24th instant was received in due time; and I can assure you that I have read it with more than an ordinary degree of interest.

My attention was first turned to the subject of the planets' rotations about ten years since. How many hypotheses I have formed, tested, and rejected, and how many hours of solitary toil the subject has cost me, I shall not undertake to tell you. If, however, I am really coming to the shore at last, I shall not regret my labors. My health, during the last three

years, has been so feeble that I could not study much on any subject. The theorem which I sent you had been lying on my table since August, 1848. A few months since, I sent it to Mr. E. C. Herrick, of New Haven. He declined, however, expressing any opinion on the subject, and suggested that I should submit it to yourself. It was, as you suppose, the nebular hypothesis that suggested my law of rotation.

* * * * *

I feel under great obligations to you for your offer to make what you call my "discovery" public "through the medium of some of our journals and scientific memoirs."

I regret that I have nothing in proper form for publication; and, as I am about leaving Pottsville, to spend my August vacation in the country, I shall not be able to give the subject attention before September. * *

Allow me to leave the matter entirely in your hands. Anything I have written is at your disposal. Should you see proper to publish an article, in your own name, giving me credit for suggesting the law itself, I should be highly gratified.

The mass of Uranus, $\frac{1}{2\,1\,0\,0\,0}$, which you have used, is one of which I had not heard. Struve's value, mentioned in my former letter, was furnished me by Mr. Herrick. I labor under considerable disadvantage from the want of libraries and scientific journals.

I shall be glad to hear from you at any time.

Very respectfully, your obedient servant,

DANIEL KIRKWOOD.

---

For the Journal of the Franklin Institute.

## *The Screw Propeller.*

The question of the relative merits of the side wheel and screw propeller, as methods of applying steam power to the purposes of navigation, is one which has of late years engrossed much attention from Engineers, and seems still to be undecided; for the repeated failures which have hitherto induced so great a want of confidence in the latter form of wheel, may, we think, be attributable, not to the falsity of the principle involved, but to its injudicious application.

So far as theory is concerned, the screw propeller presents many and great advantages over the old plan, and as the results of practice do not appear to correspond to the hopes of improvement held out, we think that an inquiry into the reasons of such a discrepancy may not be amiss.

The advantages which should result from the use of the propeller are briefly these: a decreased cost and increased stowage for freight, and a more economical and equable result from the engine; both of which will, we believe, appear reasonable from the following considerations.

First, To develope an equal amount of power, propeller engines may be made much smaller than those for side wheel; for, by "equal power," is to be understood an equal amount of water converted into steam and used (at the same point of expansion) in a given time, or, as implying the same thing, an equal amount of boiler surface. Now, as propellers may be worked at a much higher number of revolutions than side wheels, it

follows that a proportionably smaller cylinder may be used, in order to develope the same power. The engines, therefore, being smaller, will of course be less expensive, (making the whole cost less,) and will require less room in the vessel, thereby leaving more room for stowage. That this latter is not a trivial consideration, will appear from the fact that a pair of ordinary side lever engines, (which are generally used in this country,) attached to side wheels, require more than twice the space demanded by engines of the same capacity placed transversely in the vessel for attachment to the propeller shaft, not to mention an equal disparity in the *weight* of the machinery, whose diminution permits a decreased draft of water, and thereby lessens the resistance, or increases the speed of the vessel with the same consumption of fuel. As an example of this position, two side lever engines for a steamer of 900 tons require a space of 7500 cubic feet, and will weigh, including wheels, shafts, &c., 130 tons; while a pair of propeller engines for the same vessel, to give the same power, require 3500 cubic feet, and will weigh but 70 tons, including the propeller and shaft; thus effecting a saving of 60 tons and 4000 feet of space, which is equivalent to a stowage of 110 tons. So that nearly one-seventh more *weight* may be transported at the same expense, or if the cargo is of a bulky nature, *one-fourth* more freight may be carried without increasing the resistance.

But, Secondly, we argue that the use of propellers admits of a more economical and equable action in the engines. For a screw propeller *properly constructed*, always acts upon the water through every point of its surface with precisely the same pressure, because, in such a wheel, every point will advance through equal distances in the same time, thus making available every inch of the blades as propelling surface; while in side wheels, however large they may be, there is always a considerable difference in the velocities of the outer and inner points of the bucket, so that a portion of the bucket is *dragged* by the vessel, or is at least comparatively useless, while another portion moves at a velocity far exceeding it, and a part of the propelling power of the wheel is expended without an adequate result. Besides which, the side wheel acts upon the water, not in a direction opposite to the motion of the vessel, but enters and departs from it at an angle which increases with the diminution of the diameter; while in the screw, the pressure against the water is uniform in amount, and constantly in a direction parallel to the vessel's motion.

A practical proof of the value of such advantages is found in the fact, that the "slip" in the side wheel varies from 25 to 30 per cent., and in the propeller, when of proper form, only 15 to 18 per cent.

In heavy weather, at sea, this disparity becomes still more strongly marked, for here the motion of the vessel, and of the sea, causes the paddle wheels to be alternately immersed to a great depth, and entirely raised out of the water, thereby producing two evil effects: 1st, to yaw the vessel from side to side, and of course increase her resistance, it being evident that the continued immersion of one wheel only would cause the vessel to turn round; 2d, to produce an irregular and very trying strain on all parts of the engine, but especially on the shafts.

If, then, these are some of the advantages which ought to result from the use of the screw propellor, the question naturally presents itself, Why

has not experience verified so plausible a theory? What have been the causes of so many failures? We need only point to the numerous small propeller craft which ply along our coast, to prove that at least one branch of our trade has received a valuable auxiliary in the screw; and we think that the reasons why it has not been equally successful in marine navigation, on a larger scale, and involving a higher speed, are principally to be found in a want of knowledge and calculation of the relations which should exist between the means and the end.

It must be remembered that, while the talents and experience of the last forty years have been expended, both in England, France, and America, in perfecting the side wheel and its applications, only ten years have elapsed since the screw propeller was introduced to the American public, of which five only have gone by since the first successful application of the principle to a large sea steamer;—that while the examples of the first-named plan are numberless, both in the old world and the new, those of the last are but few in number, and generally made under discouraging auspices;—that while the former has received the sanction of continued and successful use, the latter has to contend with that prejudice which always exists against new inventions; and, with these things in view, can it be a matter of surprise that there should be repeated, and, in some cases, disastrous failures? We have yet to learn from that expensive teacher, Experience, the best form to be given to the propeller, a point which has never been so decided as to leave no room for discussion. We have to learn the best shape for the vessel, for why, if side wheel steamers require a different form from sailing vessels, should it be unreasonable to suppose that the two kinds of steamers require different proportions? And, more than all, we must trust less to guess-work and use more calculation, both in proportioning the engines and propellers to each other, and to the work they have to do, and in disposing the machinery in the hull with a view to the speed and sea qualities of the steamer. This is, we are aware, a simple thing, and one easily arrived at, yet three-fourths of the failures which have disgraced the cause of propellers have been due, in great part, to an utter want of the necessary calculations.

And, despite the triumphant attitude of the advocate of side wheels, when pointing to the long list of sea steamers upon that plan, now built or in process of construction, we venture to predict the time, not far distant, when the experience of our commercial marine shall vindicate the just claims of the screw propeller, and entitle it to a higher degree of consideration than the much vaunted side wheel itself. HELIX.

---

For the Journal of the Franklin Institute.

## *Our Steam Navy.*

Within the last twenty years, the navies of England and France have undergone a great change by the introduction of steamers, and in any naval contest this country, at the onset, would suffer from the want of a suitable number of vessels of that class. By the liberal aid which the English Government have extended to private companies, they have in reserve a very large number of first class steamers at a nominal expense. Our own go-

vernment are now trying, in a measure, to make up for lost time, and contracts have been made with parties, who are to build the following steamers for the routes designated, with the understanding that, in case of war, the Navy Department may take the vessels at a valuation.

| | | | | |
|---|---|---|---|---|
| 4 of | 2700 | tons, | to run from | New York to Liverpool. |
| 4 " | 2400 | " | " | New York to New Orleans. |
| 3 " | 800 | " | " | Panama to Oregon. |
| 3 " | 1800 | " | " | New York to Bremen. |

Of these vessels, there are 2 of the New Orleans line finished, 3 of the Pacific line, and 2 of the Bremen line; the rest are in a state of forwardness, and will probably be all done in 12 months. In addition to the above, there are 13 sea steamers, from 500 to 1000 tons burthen, employed in private service between New York and New Orleans, at the different ports, making an aggregate of 40,000 tons, which could be at the disposal of the government when required, although several of the vessels have no mail contract.

Having spoken of the private steamers, those that the government *may have*, I propose to go on, and speak of those vessels which really belong to the Navy, most of which have been built from the designs furnished by the proper departments, and may, therefore, be considered indicative of the ideas entertained at the Navy Department in relation to war steamers. This, of course, applies to those now building, and not to those already built, of which I shall speak first.

The first of the naval steamers we now have is the "Fulton," built about 12 years since. It is much to the credit of the Department, that no person has been willing to assume the responsibility of having designed this vessel; like Japhet, she has long been in search of a father, but without any prospect of success. She is now at anchor at the Brooklyn Navy Yard, being of no service, except to be used in the harbor of New York. The Department would do well to remove the machinery, which is very good, and, with some changes, would answer for a ship of 1000 tons; as she now is, she would not be safe out of the harbor, and cannot be considered as of any account when speaking of *sea steamers*.

Our second vessel is the "Mississippi," a fine steamer, built in 1841, about 220 feet long, 40 feet beam, 23 feet hold, with 2 English marine side lever engines, of 460 horse power, and 4 copper boilers for bituminous coal. This vessel has been in commission about 8 years, during much of which time she has been in active service, and has always given satisfaction. She has recently made the passage from Norfolk to Gibraltar in 16 days, with an average consumption of 30 tons of coal in 24 hours. The "Missouri," a sister ship, but with inclined engines, was burnt a few years since at Gibraltar.

Our third vessel is the "Princeton," a propeller. This ship is about 160 feet long, 30 feet beam, and 20 feet hold; has two semi-cylinder engines, and a propeller of 14 feet diameter; 3 boilers of iron, and uses a fan to increase the draft, natural draft not being sufficient to supply the required head of steam. This vessel may be considered the best of her class, and has done considerable service. She has just returned from a two years' cruise in the Mediterranean, and her hull has been condemned.

She was built in 1843, of white oak obtained in a hurry, and her rapid decay is, in a great measure, no doubt, owing to the great heat of the boilers.

Our fourth vessel is the "Allegheny," built of iron at Pittsburg two years since. She is about 180 feet long, 32 feet beam, and 19 feet hold. She is propelled by two of Hunter's submerged wheels, of 14 feet diameter, and 4 feet face, with engines of 60 inches diameter of cylinders, and 4 feet stroke; usual number of revolutions 30; 2 boilers for bituminous coal, with natural draft. The model of this ship is peculiar to this mode of propelling, being cut away under the water line, so as to allow the paddles to project. This vessel has been in service about two years, most of the time at Brazil and the Mediterranean, from whence she recently returned. Her speed at sea is not more than 6 miles per hour, and she is probably the last of her class, as this mode of propelling has nothing to recommend it to favor.

Our next vessels are the "Massachusetts" and "Edith," propellers, both now in the Pacific. These vessels were bought from private service during the Mexican War, and were transferred to the Navy Department at its close. They are about 500 and 700 tons, with a speed of from 6 to 7 miles per hour, and would most likely be used as transports.

The "Water Witch" comes next, a small iron steamer, with side wheels. She was originally built with Hunter's wheel, but condemned, then lengthened and Loper's propeller put in; she then made the passage from Philadelphia to Norfolk, was then again condemned, and a condensing engine and side wheels put in. She is now considered a fair vessel of about 250 tons.

The last we have is the "Vixen," a small vessel 118 feet long, 22 feet beam, and 8 feet hold, originally built for the Mexican Government; engine with 36-inch cylinder, 6 feet stroke; speed 8 miles per hour. This and the "Spitfire," a sister vessel, were constantly employed, during the Mexican War, on the coast of Mexico, where their light draft of water rendered them invaluable.

These are all the vessels at present belonging to the Navy that are finished, and can be brought into use on our seaboard. I will continue the subject, and speak of the steamers now building in your next. X.

---

For the Journal of the Franklin Institute.

### *The Propeller Steam Ship "Carolina."*

This fine steamer made a trial trip on Tuesday, the 25th of September, and, I understand, gave general satisfaction to her builders, and met their fullest expectations. I therefore furnish you with the following particulars of her construction: Length over all, 164 feet; between perpendiculars, 149 feet; length of keel, 139 feet; breadth of beam 29 feet; and depth of hold, 18 feet 6 inches.

She has two direct action condensing steam engines, with the cylinders placed directly over the shafts. Diameter of cylinders, 44 inches, and 3 feet stroke. One engine is directly abaft the other, and both are attached to the same shaft, at right angles. There are two air pumps, of 30 inches diameter and 20 inches stroke. These pumps are geared from the pro-

peller shaft by spur wheels, so arranged that, while the engines make 60 revolutions, the air pumps each make but 25 strokes. The object of this reduction of speed in the air pumps, (which is not a new idea,) was to avoid the shock produced on metal valves by high velocity. This objection is entirely obviated by the use of valves of vulcanized India rubber. By this great reduction in the speed of the air pumps, the relative capacity between them and the cylinders is very much changed, reducing them to about $\frac{1}{10}$th the capacity of the cylinders, while the usual proportion is $\frac{1}{6}$th. With a moderate pressure of steam, and cutting off at one-half, no difficulty may be found, but I think the air pumps would be found too small for a full pressure of steam, and working full stroke.

The propeller is Loper's, made of composition, 11 feet 4 inches diameter; angle at the hub, 20°; at the periphery, 48°. There are 4 blades, and the extreme width of each at the periphery is $7\frac{1}{2}$ feet. The pitch of the screw is such that, working in a solid, the centre of effort would advance $27\frac{7}{8}$ feet per revolution. On her trial trip she is reported to have averaged 42 revolutions per minute; the speed of the propeller was then $13\frac{8}{10}$ miles per hour. The speed of the vessel at the same time was 10 miles per hour. Pressure of steam, 20 lbs., cutting off at one half.

She has two boilers, and burns anthracite coal, with natural draft. Blowers are now being added, which will increase the pressure of steam, but with a corresponding increased consumption of fuel.

As a whole, the "Carolina" is a very creditable job. Messrs. Reanie, Neafie & Co., who built the engines, and Messrs. Byerly & Son, who built the hull, have certainly done justice to their work; and although I think it an error of judgment, on the part of those who designed her, to place the centre of weight so far abaft the centre of buoyancy, which renders it necessary to carry a considerable quantity of ballast to bring her on an even keel, still, as it has evidently been intentional, I suppose there are good reasons for it, although not made public. W.

---

## FRANKLIN INSTITUTE.

*Proceedings of the Stated Monthly Meeting, September 20th,* 1849.

Samuel V. Merrick, President, in the chair.

Thomas Fletcher, Vice President.

Isaac B. Garrigues, Recording Secretary.

The minutes of the last meeting were read and approved.

Donations to the Library were received from—The Royal Geographical Society, London; E. M. Stanton, Esq., Pittsburg, Pa.; Major Alfred Mordecai, Washington City, D. C.; A. C. Morton, Portland, Me.; and from Prof. Jno. S. Hart, Prof. Jno. F. Frazer, Messrs. S. V. Merrick, F. Fraley, S. Norris, J. C. Trautwine, John C. Cresson, John E. Addicks, Emlen Cresson, Owen Evans, James C. Booth, Solomon W. Roberts, and Lea & Blanchard, Philadelphia, Pa.

Donations to the Cabinet of Minerals were received from Prof. John F. Frazer.

The Treasurer's monthly statement of the receipts and payments was read.

The Board of Managers and Standing Committees reported their minutes.

New candidates for membership in the Institute were proposed, and those proposed at the last meeting were elected.

Mr. I. W. P. Lewis, Civil Engineer, presented several models, and explained their design. 1st, A model of a cast iron lantern, for the dioptric apparatus for illuminating lighthouses. This model shewed the improvements that Mr. Lewis had introduced in the construction of lanterns since 1839, in which year he refitted Boston Lighthouse with a lantern of bronze, glazed with plate glass, 36×24 inches, and in 1840, refitted Cape Cod Light with a lantern of cast iron. The nature of the improvements consisted in so constructing the framework as to retain all the requisite strength, and yet to diminish the obstruction to the light from the apparatus, in its passage to the horizon. The reduction at the two lights named above amounted to several square feet. Another important point was in ventilating the lantern, and furnishing the keepers with facilities for admitting a copious and steady current of pure air to supply the combustion, and also to give free egress to the gases generated in producing the light, so as to prevent the condensation of their vapors on the glass of the lantern, which, in winter, soon forms a coating of ice or frost, and, in summer, keeps the glass and floor wet and uncomfortable. Mr. Lewis's aim had been to simplify the construction so as to reduce the cost; to avoid the mixture of metals, so as to avoid galvanic action, and to proportion the several parts so as to leave the weight and bulk easily manageable by three or four laborers, and therefore adapted for landing on any part of the coast, or raised to the top of a tower without the need of cumbrous machinery. 2d, A model of a trammel, for setting screw piles in deep water with all the accuracy that might be desired. This trammel had been tried with complete success on the works erecting on the Brandywine Shoal. The foundation piles had been screwed down with entire precision, and also the piles forming the ice-breaker, to protect the former. The trammel consisted of a triangular frame, with sleeves at the angles, and could be made to subtend any angle required by the nature of the work. 3d, A model in which the screw and atmospheric pile were shown in combination, the object being to obtain foundations in deep water on a large scale, using the screw pile as a guide for the descent of the atmospheric pile.

Mr. Alexander Bond presented a working model of a stern propeller, driven by two steam engines, which was put into operation during the meeting. The propeller is on the principle of a vertical scull, moving laterally in a peculiar curve, a clear idea of which cannot be conveyed without a drawing, which, with a description, may probably be given hereafter.

A universal chuck, invented by Messrs. Norton & Parry of this city, was exhibited and described.

A very highly finished working model of a press for making bricks from dry clay, was presented and put in action by the inventor, Mr. Thomas Culbertson, of this city, and elicited much admiration. Engravings illustrative of it, with a full description, will be given in the next number of the Journal of the Institute.

A number of beautiful articles made of gutta percha, from the establishment of Mr. John Thornley, of this city, was presented for the examination of the members, and a brief description given by the chairman.

Mr. Langenheim presented a very beautiful Talbotype portrait of a large size, which exhibited an improvement in the art; and also a Talbotype pic-

ture of the iron lighthouse, (intended for Carysfort Reef,) temporarily erected in the courtyard of the foundry of Messrs. Merrick & Towne, of this city, which attracted much attention from the members. The Chairman pointed out the applicability of this art for the illustration of machinery. The picture, surrounded by an elaborate gilt gutta percha frame, is now deposited in the rooms of the Institute.

Mr. George W. Yerger, of this city, exhibited a very light, and apparently durable and efficient artificial leg, the movements of which closely approximated to nature. It was shown in action, much to the satisfaction of the members.

A patent door-holder, invented by Mr. R. T. Fry, of this city, was submitted to the examination of the meeting. This door-holder operates by means of a spring of sufficient power to preserve the door in position, and to permit it to be closed, without lifting a latch, by a simple pull of the door itself. The model is left on deposit in the Cabinet of the Institute.

---

## COMMITTEE ON SCIENCE AND THE ARTS.

### *Report on the Catoptric, Dioptric, and Catadioptric Systems of Lights for Lighthouses.*

*Appendix containing the Notes referred to in the Report.*

Continued from page 252.

NOTE 5 *continued.* See the Appendix to the Report of 1845, to the British Parliament, before cited. Memorandum by Mr. Alan Stevenson. Also, the Notes on the Illumination of Lighthouses, by the same writer, before cited, containing the results of experiments on the loss of light by reflection, and the transmission of light by the dioptric lenses and the catadioptric rings.

NOTES 6, 7, 8, 9, and 10. See the Senate Doc., No. 488, 28th Cong., 1st Sess. Also, the Report of Professors Pierce and Lovering, before cited. Also, the Letter of Leonor Fresnel, before cited. Also, the Annuaire, by Arago, before cited. Also, the Report to the British Parliament, before cited. Also, Report of Mr. I. W. P. Lewis, before cited. Also, Report of the Committee of the Royal Society of Edinburgh, before cited. Also, Art. 13, Vol. 127, p. 211, of the Philosophical Transactions of the Royal Society of London, for 1837, "On the Adaptation of the different modes of Illuminating Lighthouses," &c. In this paper, the relative effect of varying the sizes of the reflectors and lamps is discussed.

See also, Edinburgh Review, Vol. LVII, for 1833, Art. 8, page 169, "On the Construction of Polyzonal Lenses and Mirrors of great magnitude, for Lighthouses," &c., by David Brewster, LL. D., F. R. S. Also, Edinburgh Philosophical Journal, Vol. VIII, p. 160, for 1823; "Account of a New System of Illumination for Lighthouses," by the same author; Edinburg, 1827. Also, Edinburg Review, Vol. LXI, 1835, Art. 13, 221, by the same. Also, the Communication from Messrs. E. & G. W. Blunt, of New York, before cited. Doc. 258 and 738, 25th Cong., 2d Sess. To the zeal and intelligence of these gentlemen, the United States are indebted for the introduction of the Fresnel system at the Neversink station, near New York.